# THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JUNE 30, 1898. CHICAGO, ILL. NUMBER 26



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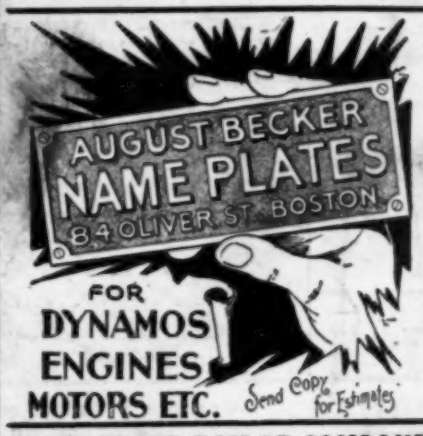


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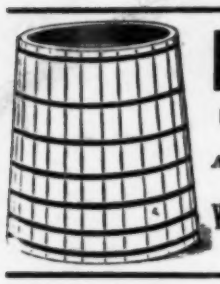

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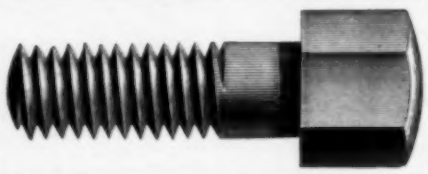

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# THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. · JUNE 30, 1898. CHICAGO, ILL. NUMBER 26

## THE WEEK IN IRON CIRCLES.

### THE MARKET AT LARGE.

Retarding influences have been more noticeable n the iron trade in the past week. Many producers, who have comfortably filled order books, are making no effort to push matters, awaiting with complacency the termination of the mid-summer lull. In other quarters, the effort to get business, with buyers indifferent to any thing but early needs, has developed some furtner weak spots. Meantime the net result of blast furnace changes is a lessening of production. But this is felt most in Bessemer, and the curtailment of the next few weeks will be in the same line. To offset it, is the shutting down of mills, though the idle period promises to be shorter than usual, only sufficient to care for needed repairs. The non-Bessemer furnace companies have a further meeting this week in Philadelphia. Recent developments in foundry iron have been less favorable to the carrying out of the restrictive scheme. To-day the East is its strongest advocate. Southern iron has been inactive, and the feeling is naturally weaker. In the Chicago district sales have been made close to $9.75 for No. 2, or a Birmingham basis of $6.75, counting full freight; yet some quotations are still held at $7 Birmingham. Local sellers, with customers pressing for deliveries, maintain $11 Chicago. In the East, Virginia and Alabama irons have taken recent business at low prices and the market is in buyers' hands. If there were any assurance of an early termination of the war, the revival of exports on a considerable scale, added to the rapid development of home enterprise, would readily cure the dragging tendency now apparent throughout the market. For the most part, however, buyer and seller are proceeding on the belief that present conditions are a fair type of the next two months. Chicago reports a steady tonnage in rails, and a beginning has been made in billet sales there, though the largest contracts, which depend on developments in wire and wire nails, are still to be placed. Car work is giving bar mills and wheel foundries a large business and Western and Central Western roads are yet to place some good orders. Plate mills keep up their record, some even booking more business than their current output. The sheet mills will not shut down for the proposed six weeks, because orders in the latter half of the month have made so radical a curtailment movement unnecessary. Mills representing one-third the tonnage refused to close for any reason except repairs, and the scheme is called off. An advance of $2 a ton over the lowest prices of the spring is represented in present quotations of some of the busiest mills, this applying to black sheets as well as galvanized, which have been particularly affected by the flurry in spelter. In the Central West the only variation from the even course of the market in the past month is found in recent sales of billets for third quarter delivery, on a basis of $14.50, valley, and $14.75, Pittsburg maker's mill.

### PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
508 TRADESMEN'S BUILDING, June 29.

The abandonment of the shutting down scheme of the sheet mills came Tuesday, with the refusal of one-third of the output to co-operate. An increased demand for sheets in the last two days is given as the main reason for this outcome. In other lines, however, the usual July shut-down is being prepared for and next week will see many idle mills in the Pittsburg district. Railroads and agricultural interests continue to be good buyers.

PIG IRON.—Two or three of the valley firms will join the idle stacks after July, among them being the Mary furnace of the Ohio Iron & Steel Co., of Lowellville. This feature of the furnacemen's agreement is being well kept, but the $10 price is not yet established. Little iron is selling at any price.

Small lots of iron are still offered at $9.75 and $9.80 valley, but even for this there is no sale. There has been some additional inquiry for foundry grades and slightly better prices. A sale of 900 tons of No. 3 was made last week at $9.75. Gray forge is quoted at $9.10 to $9.15 Pittsburg, and $8.85 valley mill, but there is little movement. Quotations follow:

| | |
|---|---|
| Bessemer, valley | $ 9.75 to $ 9.85 |
| Bessemer, Pittsburg | 10.40 to 10.50 |
| No. 1 Foundry | 10.40 to 10.50 |
| No. 2 Foundry | 10.00 to 10.25 |
| No. 3 Foundry | 9.50 to 9.75 |
| Gray Forge, valley | 8.75 to 8.90 |
| Gray Forge, Pittsburg | 9.10 to 9.15 |

BILLETS AND RODS.—Some large buyers of billets have come in for the third quarter during the week and now few if any remain to be supplied. Business has been done at from $14.50 to $14.75 maker's mill, Pittsburg, and valley, and the latter is now the minimum price. Sheet bars have been dull for two weeks, and the quotation is $16.50 to $16.75 maker's mill. The dullness in the sheet trade has had much to do with the light sales of bars, keeping the buying below that of former years at this time. Rods are quoted from $20 to $20.50 maker's mill, and are very quiet.

SPIEGEL.—Spiegel is quoted at $23.50 and $24.

IRON AND STEEL SKELP.—Prices as follows: Grooved iron skelp, 1.05c to 1.07½c; sheared iron skelp, 1.12½c to 1.15c; grooved steel skelp, 97½c to 1c; sheared steel skelp, 1.05c to 1.07½c.

STRUCTURAL MATERIAL.—The market in structural material is quiet. The two local mills are comfortably filled but have nothing large in sight. Prices remain unchanged from last week. We quote: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; tees, 1.20c; zees, 1.15c, and angles, 1.05c. Universal plates in connection with other shapes are selling at 1c; alone, at 1 10c. Press dispatches announce that the contract for the San Francisco postoffice has been awarded but are unconfirmed. The job calls for 2,000 tons of material, which will probably be ordered from Pittsburg.

SHEETS.—The market is steady. At one time in the past week it appeared that the movement for a shut-down of the mills west of the Alleghenies had come almost to the operative point, the indications being that 80 per cent of the total tonnage would be represented in the affirmative responses. On Tuesday, however, the declination of mills making one-third the output was announced, and the matter was dropped. The Association of Iron and Steel Sheet Manufacturers took an active part in the effort. Several reasons contributed to the failure, the principal one being the improved outlook in sheets in the last ten days. Several mills had promised deliveries during the time of the shut-down and with others the chance of taking the business due in the summer season was too attractive to join in an effort to better prices. Late in December or early January—the dull seasons in sheets—were proposed as substitutes for the July shut-down. The feeling among sheet manufacturers is stronger than that of two weeks ago and it begins to appear that the season, although

tardy, is not to be as barren as once seemed likely. We quote 1.90c to 1.95c on No. 27, some sellers having taken a firmer attitude in the past week. Galvanized sheets are still responding to the rise in spelter. Quotations continue at 80 and 5 per cent to 80 and 7½ per cent off list, with 15 cents freight.

PLATES.—Mills are busy, with prices unchanged. It is understood that in the last two weeks the largest local interest has booked more orders than ever before in a like period. The Chicago, Rock Island & Pacific has ordered six locomotives from a local firm, making the latter's total for the month 71. Mills quote: Tank, 1.10c; shell, 1.15c; flange, 1.20c; fire box, 2c and upwards.

SPELTER.—The supply is still scant and spelter is holding its own at last week's price, $5.25. The present pinch, however, is not expected to last, as the ores have already declined.

FERRO-MANGANESE.—The largest producer of ferro-manganese quotes $50 delivered for 80 per cent domestic.

BARS.—Steel bars are steady, owing to the recent buying of agricultural interests. The needs of the latter are now fairly well provided for, some of the Northern Ohio concerns having bought their year's supply during the last week. One order of 2,000 tons was awarded Tuesday. Prices are stronger in spots, 90c to 95c being done on recent business. Bar iron is quiet at 95c Youngstown, on ordinary lots.

PIPES AND TUBES.—If the advance in spelter is to hold for some time galvanized pipe will be affected, but thus far there is no advance. The summer shut-down comes next week, and mills are not hunting business, while buyers are postponing purchases. There has been little occasion, therefore, to test the stability of the late advance, as price is not much of a consideration. Line and merchant pipe are in no demand although boiler tubes are still active. Additional discounts of six tens for less than carload business and six tens and two and a half for carload lots are quoted. Base discounts are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. Inserted joint casing is quoted at 60 and 5 per cent and screw and socket joint at 65 and 5 per cent.

RAILS AND TRACK MATERIAL.—Rails are quiet at $18, Pittsburg, and track material is quoted as follows: Iron track-bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

OLD MATERIAL.—The demand in old material is fair but in small lots. A sale of 1,000 tons of steel rails at $10.50, Pittsburg, is reported. Other sales reported are old iron rails, $13.50 valley; No. 1 wrought valley, $11.25; heavy melting steel, $10.50 gross; iron axles, $16 net; steel axles, $12.50 gross; wrought turnings, $7.25 gross; cast borings, $6 net; No. 1 cast, $9.25 gross, Pittsburg; car wheels, $10.50 gross. On other material dealers quote as follows: Charcoal scrap, $10, gross; billet and bloom ends, run of mill, $11; busheling scrap, $9.50 net; machine scrap, $9 gross.

## CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.* }
1522 MONADNOCK BLOCK, June 29. }

Smaller orders are the rule at present, although now and then a contract of considerable size is placed. Pig iron sales of last week included no large orders. In steel of various kinds a good business was done, and the demand shows no indications of falling off. The local mills are securing all the business they can handle, and are selling the equivalent of their output, at least, every week. It is expected that the Joliet mills of the Illinois Steel Co. will shut down about July 1, for a short time, for necessary repairs. This mill has been running for 18 months without a shutdown, the longest run it has ever made.

PIG IRON.—Neither Northern nor Southern furnaces made large sales last week. The demand is considerably smaller than in the early part of June, and it is not expected that any large business will be done in the next few weeks. So far as the local furnaces are concerned, this state of affairs is a relief, as they are so well sold up that it is impossible for them to accept very much more business for delivery in the next few months, and they are somewhat pushed to keep up their shipments fast enough to suit customers. Southern furnaces have a large tonnage booked and in some grades have every little to sell. On the whole, the furnace interests selling in this territory are very well fixed to go through the summer dullness. The market is no firmer than it was a week ago in Southern irons, and such business as is going is being taken, in most instances, at prices under those we quote. Northern furnaces, on the contrary, are making no concessions.

| | | | |
|---|---|---|---|
| Lake Sup. Charcoal | $11 50@13 00 | South'n Coke No. 3 | $ 9 75@10 00 |
| Local Coke Fdy. No. 1 | 11 50@12 00 | Southern No. 1 Soft | 10 35@10 60 |
| Local Coke Fdy. No. 2 | 11 00@11 50 | Southern No. 2 Soft | 10 10@10 35 |
| Local Coke Fdy. No. 3 | 10 75@11 00 | South'n Silveries | 11 25@11 50 |
| Local Scotch Fdy. No. 1 | 11 50@12 00 | Jackson Co. Silveries | 12 50@14 50 |
| Local Scotch Fdy. No. 2 | 11 00@11 50 | Ohio Strong Softeners | 12 00@13 00 |
| Local Scotch Fdy. No. 3 | 10 75@11 00 | Alabama Car Wheel | 15 00@16 00 |
| South'n Coke No. 1 | 10 35@10 60 | Malleable Bessemer | 11 50@12 00 |
| South'n Coke No. 2 | 10 10@10 35 | Coke Bessemer | 11 50@12 00 |

BARS.—The market has been quite active, and while no especially large sales were made last week, the total tonnage placed was very satisfactory. The bar mills of the Illinois Steel Co. have orders at present fully as large as ever before at this time of the year, and this without the large tonnage from the agricultural implement trade, which has heretofore come to them, but this year was placed elsewhere. The outlook is excellent, and business is expected to keep up for some time at about the present rate. Common iron is quoted at 1.05c to 1.10c; guaranteed, 1.10c to 1.15c; soft steel bars from strictly billet stock, 1.05c to 1.10c.

RAILS AND TRACK SUPPLIES.—The local mills made sales last week of over 11,000 tons of heavy rails, and about 1,000 tons of light rails. The demand is good, and further business is under negotiation. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—Sales were made in this market last week of about 3,500 tons of rods. Billets are in small demand, and no sales are reported. Rods are quoted at $22, and billets at $16.25.

CAR ORDERS.—Orders for cars are expected to be placed in this market soon, aggregating several thousand cars. Car material is in good demand, and sales of bars, axles, etc., are frequent.

STRUCTURAL MATERIAL.—No large contracts were placed last week, but a very good business was done in small lots, in a general way. The contract for the eight track Drainage Canal bridge, which was expected to have been let before this, will probably be let this week. The Western Electric Co. is figuring on large additions to its plant, which are variously estimated will take from 2,000 to 6,000 tons of material. The smaller figure is the more likely, for the present, at least. Quotations are as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.10c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at ¼ to ½ cent higher.

PLATES.—The local mills sold about 6,000 tons of plates last week, including several orders. Other business placed in the week made a good aggregate, and the demand indicates a continuance of good orders. Prices are made as follows: Tank steel, 1.10c to 1.20c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

SHEETS.—A good business was done last week, in both black and galvanized sheets. The demand is much better, and further large sales are expected to be made this week. The market is unchanged. No. 27 black sheets are quoted at 1.95c to 2c, and galvanized sheets at 80 and 10 and 2½ per cent discount.

SCRAP.—Some small sales of old car wheels and old iron rails were made last week, and there is a slightly better demand for old steel rails. Orders of most grades of scrap are small, however, and are not expected to be better immediately. Dealer's selling prices are as follows:

| | | | |
|---|---|---|---|
| Old iron rails, gross | $12 25@$12 50 | Axles, net | $14 25@$14 75 |
| Old steel rails, long, gr. | 10 50@11 00 | Cast borings, net | 4 25@ 4 50 |
| Old steel rails, short | 8 75@ 9 00 | Wrought turnings, net | 6 00@ 6 50 |
| Old wheels, gross | 11 00@11 50 | Axle turnings, net | 7 00@ 7 25 |
| Railroad forge, net | 11 50@12 00 | Mixed steel, gross | 7 25@ 7 50 |
| Dealer's forge, net | 10 00@10 50 | Stove plates, net | 5 75@ 6 00 |
| No. 1 mill, net | 7 50@ 8 00 | Heavy melting steel, gr. | 8 25@ 8 50 |
| Heavy cast, net | 8 50@ 9 00 | Old iron splice b., net. | 12 75@13 00 |
| Malleable cast, net | 8 00@ 8 50 | | |

MERCHANT STEEL.—Considerable business was placed last week, including several good season's contracts from the implement trade. General business appears to be getting better every week, and the outlook for the immediate future is excel-

lent. Prices follow: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

## CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World*, 27 VINCENT ST., June 29.

No change can be reported from the monotony of discouraging lake freight rates, big ore cargoes, car shortages at docks and consequent detentions of vessels. The car scarcity would be more pronounced, were it not that a number of furnaces are out or preparing to bank for a time, and that the movement of ore to their yards is checked. There has been some small business in ore in the past 10 days, and some ores are yet to be bought, though, as it well known, nothing of significance will be recorded in this part of the market for the remainder of the season. What is yet to be done is to dispose of piecing-out lots of old-range ores, and make some further sales of Mesabi grades. The less desirable Mesabi ores, at the prices at which they are offered, should help to some very cheap mixtures, both Bessemer and basic. Some vessels are talking of going into ordinary; others are still accepting the 45 cent Lake Superior rate and getting few cargoes at that.

PIG IRON.—The blockade on $10 iron is still in progress. A meeting of the producers was held on Tuesday from which it appears that the effects of the restriction programme are to be more marked in the next few weeks. At the same time the output of certain steel works is keeping up to the maximum, particularly in sheet bars and tin plate bars, while billets of some sections are very difficult to obtain. But current sales of billets for third quarter do not indicate that steel works are basing their cost during that period on $10 iron. Foundry iron is quiet, with a weaker feeling. The largest recent transaction was a round lot taken by a Northen Ohio agricultural interest, the business being divided between a Shenango valley furnace and a Southern firm. On No. 2, $9.25 to $9.50, valley, is the going market; on No. 1, $9.75 to $10. Charcoal irons, especially in the higher numbers, are still called for in Government work and consumption and production are in close correspondence. We quote f. o. b. Cleveland:

| | | | |
|---|---|---|---|
| Bessemer, | $10 65 | Valley Scotch No. 1 | $10 40@10 65 |
| No. 1 Strong Foundry | 10 40@10 65 | Valley Scotch No. 2 | 10 25 |
| No. 2 Strong Foundry | 10 10@10 40 | Gray Forge | 9 25 |
| No. 3 Foundry | 9 65 | Lake Superior Charcoal | 11 50 |

FINISHED MATERIAL.—An agricultural contract involving about 1,500 tons of bars, angles, tool steel, etc., was let in the past week, in Northern Ohio, a Pittsburg mill taking the business. On contracts of this character 90c, Pittsburg, is shaded a trifle on steel bars, but on the ordinary run of business 90c to 92½c is quoted. The bulk of current orders in finished lines comes in small lots, and the aggregate of these is quite well maintained. Mills in Cleveland and the Mahoning valley anticipate a brief shut-down, and only so much time will be taken as repairs require. There is a better inquiry for sheets and the larger mills are booked for a good portion of the summer, a stiffening in quotations being the result. We quote No. 27 black sheets at 2c to 2.10c, Cleveland, in small lots. Structural business is quiet and recently discussed vessel work is given up for the present. Local sheet and tin plate mills are fairly well employed. The latter covered their raw material some time ago. A 500-ton sale of slabs is reported and an inquiry for 2,000 tons. Cleveland deliveries are quoted about $15.25, and wire rods at $20.50. The wire nail demand is somewhat improved, jobbers, who have carried very light stocks, increasing their orders. We quote $1.30 in car load lots, Cleveland mill. Smooth wire is quoted $1.15.

## CINCINNATI.

June 28.

The iron market is in so uncertain a condition that it is hard to say much about it. Some of the Southern furnaces are well filled up and are holding firmly for their schedule prices while others apparently are still on the hunt for business and are making figures to take orders. There is as much diversity of opinion on the part of customers as there is diversity of opinion on the part of sellers. The week has not been marked by any considerable buying, although there has been a fair trade of a scattering kind. Requests from customers to hurry shipments are still common, while few are asking to have shipments deferred. There is talk of a demand for an advance to 45c a ton by Southern coal miners, an increase of 7½c. Producers would not pay such an increase. There has been a steady trade of late in charcoal iron for Government work, the demand keeping up in an unusual way. We quote f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.50; No. 2, $9.25; No. 3, $8.85; No. 4 and gray forge, $8.50; mottled $8.25 to $8.50; No. 1 soft, $9.50; No. 2, $9 15; Tennessee charcoal, No. 1, $12.50 to $13; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Jackson county silvery, No. 1, $12 to $12.50; standard Georgia car wheel, $14.25 to $15.

## PHILADELPHIA.

June 28.

The situation at the end of the first half of the year is in many respects unsatisfactory. The large production of the past six months and the growth of the export trade until disturbed by the war, together with the prodigious consumption sitll going on, and the general employment of mills in all lines, are on one side; but against these considerations are the unremunerative prices that persist in every department. The market is weak and overloaded, and the summer months are not expected to bring any substantial relief. In pig iron buyers are able to command favorable terms, whenever ready to do business. There is some diversity in quotations. Quantity, terms of payment, dates of deliveries and similar considerations are all taken into account, but the buyer who can take a large lot and settle for it promptly commands all the concessions that are going. No. 1X foundry is selling at $11.50; No. 2X foundry at $10.75; No. 2 plain at $10 and mill iron at $9.75 to $9.85 for ordinary and $10 for standard. Basic is quoted $10 to $10.10. Steel billets are very little in demand; they are quoted $16.75, with large buyers waiting for special inducements. Business in plates and shapes is not as depressed as in some other lines, although there is a falling off in large orders. The mills are very well supplied with work, and can get along through the coming month, and possibly beyond that if the small demand keeps up, as appears likely. Bars are dull and offered at extremely low prices, which in some cases has resulted in large lots being taken for summer and fall delivery.

## Personal.

Arthur Holland, of the iron and steel firm of Holland & Co., Pittsburg, is closing up his business there, having taken the London agency for the American Steel & Wire Co., and of the Illinois Steel Co. He expects to sail early in July.

J. N. Chester, for several years manager of the Pittsburg agency of Henry R. Worthington, has been promoted to a position in the New York office, and will be succeeded in Pittsburg by D. H. Chester, now the Cleveland agent of the same company.

A. L. Carleton, formerly with the Pratt & Whitney Co., Hartford, Conn., has accepted the position of superintendent of the Benj. Atha & Illingworth Co.'s steel foundry, at Newark, N. J., entering upon his labors this week. Mr. Carleton is a progressive foundryman, who has been identified with the National association movement from the beginning.

E. P. Leeds, of the Brown Hoisting & Conveying Machine Co., Cleveland, has gone to London to assume charge of the company's office there.

E. T. Clymer, general manager of the Allentown Iron Co., Allentown, Pa., has resigned to accept the management of the Antrim Iron Co., whose charcoal furnace is at Mancelona, Mich.

John A. Potter has resigned as general manager of the Cleveland Steel Co. It is probable that he will go abroad soon in connection with the organization of a company to engage in the manufacture of ordnance.

W. D. Moore having resigned his position as secretary of the United States Radiator Co., Dunkirk, N. Y., Samuel B. Durand has been elected secretary, and Newell F. Gould, assistant treasurer. Mr. Durand and Mr. Gould have been connected with this company for some time, and the changes made are simply advancements.

# THE IRON TRADE REVIEW

AND

## INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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JUNE 30, 1898.


### THE WORKMEN'S COMPENSATION ACT.

On the first day of July the new law entitled an "Act for Compensation of Workmen for Accident," will be in force in Great Britain, affecting immediately about 6,000,000 operatives, and it is expected that eventually as many more will be included in its provisions. The changes in industrial conditions that will be produced by this new Parliamentary act are so far reaching and radical that it would be unwise to attempt to predict the practical effect at this time. The bill was introduced early in 1897 by the Home Secretary, and it has been the subject of much debate, in and out of parliament, and also of discussion in English papers; but it has attracted comparatively little notice in this country.

The most striking feature of the new bill is its abrogation of the old, time honored and well established doctrine, known as the law of "common employment." This doctrine was established in England in 1837 and recognized two fundamental principles: First, accidents are liable to occur in all occupations, even with most careful management; second, it is to be presumed that an employe voluntarily assumes the risks incident to such occupation, and an action for damages therefore would not lie against an employer unless neglect of statutory duty on his part could be proved. The new law recognizes no release of employer's liability for accident to workmen, unless due to wilful intention, or culpable negligence on the part of the operative himself. The London *Engineering* said some time ago:

> "It is of course an elementary duty on the part of every employer to take all reasonable precautions against accident; but this bill goes far beyond that, for not only will the employer be liable on account of pure accident, and for negligence on the part of others he employs, but also in cases where accident arises from the negligence of the injured workman himself. A man may be employed for one hour and the next may, through his own negligence, meet with an accident that will disable him, and then he must be supported out of the profits on a business—profits which he has done nothing toward earning."

The Duke of Argyle in discussing the proposed measure nearly a year ago said that formerly the doctrine of common employment was often used to destroy any right to compensation, but this bill "asserts the right absolutely on behalf of one only of the partners in the common interests which are alleged and lays the burden of it exclusively on the other."

Statistics have been presented showing that the new bill will impose a burden of £1 12s. per annum for every man employed in the coal mines and might reach £2 18s. per head annually. This tax the consumer would have to pay in increased price of coal. The president of a large coal company estimated that the average charge for accident cases would amount to about £7,000 a year to his company. One of the first effects of the passing of the act has been to create a great boom in accident insurance business in England, and it would seem scarcely an exaggeration to say that if this act had been drawn specifically in the interests of such companies its provisions could scarcely have been more sweeping, or more favorable to such business.

All sorts of schemes of mutual accident insurance have been proposed by manufacturers but satisfactory plans have not yet been formulated, owing to the uncertain elements in the problem, such as the difference in risk of accident in different occupations, and in even similar work in different places. Meanwhile the well known secretary of the British Iron and Steel Association, Mr. J. Stephen Jeans, has made careful inquiry into the number of accidents occurring during a period of several years at the blast furnaces in Great Britain, employing about 15,000 hands and paying wages averaging nearly £300,000 per annum. From these and other similar data, calculations have been made, from which it appears that the rates of accident insurance fixed upon by the various companies are excessive, and Mr. Chamberlain has said that they are "preposterous." The premiums asked for insurance exceeded his calculations "three-fold, five-fold, and even ten-fold." A curious and unexpected development is the opposition to the new act, shown by many skilled workmen, the very class whom the act is intended to benefit. The reason therefor is the fear upon their part that the act will interefere with the prevailing custom under the present law of "contracting out," whereby a workman on obtaining employment voluntarily signs a release and renounces all right to claim damages under any circumstances for accident from his employers, and in lieu thereof he becomes a member of a mutual beneficial society, organized in the establishment in which he seeks employment. These associations are very common in England and some of them have large reserve funds for the relief of sick or injured employes. As a rule, the employers contribute an amount at least equal to the total annual dues paid by the men. Under the new compulsory compensation for accident law, the employers will, it is said, no longer continue their subscriptions to these mutual associations because they cannot thereby be relieved from liability for accident as heretofore.

The leading article in the London *Engineer* of June 17 strongly opposes the new law on the

ground of injustice to employers of labor, and in relation to insurance says:

"Condensing the results of our investigations into round figures, we find that, roughly speaking, and as far as we have been able to ascertain in the engineering trade, had the new Act been in operation during the past 25 years, the average yearly liability of firms for accidents under it and under the old Employers' Liability Act together would have been covered five or six times over by the minimum premium of 30s. per £100 now being asked."

The *Engineer* adds that this law will prove an incentive to imposture and even to the commission of such horrible crimes as child-maiming and murder.

Without presuming to criticize the justice, wisdom, or practicability of the new act, it would be well to recollect that every new law of similar character that has been passed in England in the past half century has met with opposition at first and has been accepted eventually without complaint, and, in some instances, with mutually beneficial results to employers and employes.

Great Britain is now passing through a period of industrial evolution, or revolution, to which the new act contributes one additional element of uncertainty; and it will be interesting both for employers and employes in this country to watch the progress of events during the next few years in the tight little isle. ALEX. E. OUTERBRIDGE, JR.

## THE IRON AND STEEL DIRECTORY.

The forthcoming 14th edition of the Directory to the Iron and Steel Works of the United States, of which the preface is before us, reflects much of the change that has come over the iron trade in the past two years. There are 396 printed pages, or 62 more than in the edition of 1896, and to the contents of the latter have been added complete lists of rail mills, structural mills, steel casting works, bolt, nut and rivet works, chain works, seamless tube works, skelp mills and riveted pipe works. General Manager Swank refers in the preface to the difficulty of making a list of furnaces which are either active or have a reasonable expectation of being active again. Owners of not a few furnaces now idle insist that they are not abandoned and are in condition to run, while it is perfectly clear in the minds of others that they will never be in blast again. There has been a more vigorous pruning of the list in this Directory than in others; and in addition, it is indicated in connection with each furnace described, when it was last in blast. This enables the reader to draw his own conclusions as to the future. The Directory for 1896 showed 469 furnaces on the so-called active list. This was 100 less than in 1892 and 50 less than in 1894. In the present volume the list of 1896 is reduced by 49 or to 420. It is added that 50 of these are quite certain never to go again, and doubtless this estimate is quite conservative in view of the fact that less than 200 furnaces were active with production at the recent 12,000,000-ton pace. Four furnaces now building in Ohio will have a combined output equal to that of from 25 to 30 furnaces that might be picked out on the list. When furnaces now building are completed it is estimated that the total available annual capacity of the country will be 18,500,000 tons. It would seem that no more blast furnaces are needed, and yet it will always be true that new blast furnaces are needed, that can produce a maximum of pig iron at a minimum of cost. Their coming will always mean the adding of several times their number to the abandoned list. Of completed furnaces, 8 coke stacks and 1 charcoal stack have been added to the list since 1896, as against the 49 dropped.

The steel works portion of the Directory, of which the preface summation is reproduced on another page, shows 45 Bessemer plants, with 100 converters, against 50 plants and 109 converters in 1896, and an annual converting capacity of 10,633,000 gross tons to-day, against 9,602,450 in 1896. No new Bessemer plants have been built since January, 1896. The capacity of the 286 open-hearth furnaces built and building is 3,522,250 gross tons; the 245 of 1896 had a capacity of 2,430,450 tons. The prominence of basic steel is emphasized in the lists, as well as in the annual statistics of production. In 1898 there are 47 plants prepared to make direct open-hearth castings, as against 35 in 1896 and 28 in 1894. Of the 45 crucible steel plants in the country, the annual capacity is 95,000 gross tons; in 1896 it was 98,700 tons.

The present volume describes 504 completed rolling mills and steel works, of which 462 contain trains of rolls and 42 have no rolls. In the two years, 32 new mills have been built and 33 abandoned, a net decrease of 1, but the rolling capacity in April, 1898, was 17,929,850 gross tons, against 14,763,920 tons in January, 1896. In puddling furnaces there has been a decrease in the two years from 4,408 to 3,889.

The changes in plants representing the various ramifications of finished material are not so pronounced. There are 51 plants rolling rails of various descriptions; 66 manufacturing various forms of structural material, including bridge rods, bridge plates, structural tubing, etc.; 230 plate, sheet and skelp mills; 69 completed tin plate works; 46 cut nail mills, with 4,544 machines; 24 wire rod mills, 74 wire drawing plants and 53 wire nail mills; 121 car-building works, 62 car-axle works, 110 car-wheel works and 24 locomotive works; 33 cast iron gas and water pipe works; 28 wrought iron and wrought steel pipe works; 30 seamless drawn steel tube, brazed tube and lock-jointed tube works; 117 bolt, nut and rivet works; 88 malleable iron works, 66 stamping works, and 12 horse-nail works; 44 iron and steel ship yards, and 87 iron and steel bridge building works.

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The record of new railroad building in the United States in the first half of 1898, as made up by the *Railroad Gazette*, shows 1,092 miles added in that time to the mileage in operation. It is believed that later returns will add to this total; and if, as is the rule, more railroad is built in the second half of the year than in the first, it is estimated that the summary for the year will show more than 2,200 miles built, or about 100 miles more than in 1897. The *Railroad Gazette* notes that a large proportion of the new mileage has been built to supply feeders to roads now in operation, this being in accordance with an increasing tendency of recent years. It is noteworthy that 620 miles of new road, or three-fifths of all, is in States west of the Mississippi, in a number of which open hostility to railroads, as expressed in legislation, would naturally discourage further investments.

---

THE new Uehling casting machine at the furnace plant of Runyon, Stubbs & Co., Struthers, O., was put in successful operation last Saturday. The design is similar to the original Uehling casting machine at the Lucy furnaces, Pittsburg, and consists of the casting machine proper and a conveyor on which the hot pigs are carried through a tank of water. It is different from the Lucy machine in that the conveyor runs in the same direction as the casting machine instead of at right angles. The conveyor, too, travels at a slower pace, thus keeping the pigs under water for a longer time. The experiment was tried of dropping the iron from the casting machine into steel buckets filled with water and thence into hopper cars. The wear on machinery was found too great and the conveyor was substituted. The initial performance of the new apparatus was entirely satisfactory.

## THE NEW ANNISTON PIPE FOUNDRY.

Exterior and interior views of the new pipe foundry of the American Pipe & Foundry Co., at Anniston, Ala., are given below, the plant being interesting because it embodies some of the latest ideas in this industry and because it is one of the largest of its class. The old building was burned in August, 1897, and a contract was made with the Wellman-Seaver Engineering Co., of Cleveland, to design a new building and superintend its construction. Complete detail plans and specifications were furnished by the Wellman-Seaver Engineering Co., and on these the contract was let, the work being carried out under the direction and inspection of the Cleveland company. The result is a plant embodying advanced practice both in construction and equipment.

The building is 90 feet wide in the clear, 500 feet long and 29 feet high from the foundation to the under side of the roof trusses. The crane service is noteworthy for several reasons. The greater part of the weight of the cranes is supported by means of fixed central columns. To the top of these columns are attached pintels constructed somewhat similar to the thrust bearing on a marine engine. Resting on these bearings are the center supports of two independent swinging cranes to each pit. The outer ends of the cranes are supported by means of circular runways supported by the roof. This arrangement gives each casting pit the service of two cranes, and at the same time enables the cranes to rotate through a complete circle, an advantage not before obtained in a pipe foundry. By means of this construction, the entire horizontal strains from the cranes are done away with and the great racking strains on the building avoided.

The new foundry was occupied about two months ago and its operation has been highly satisfactory. A large output, with important economies, is assured.

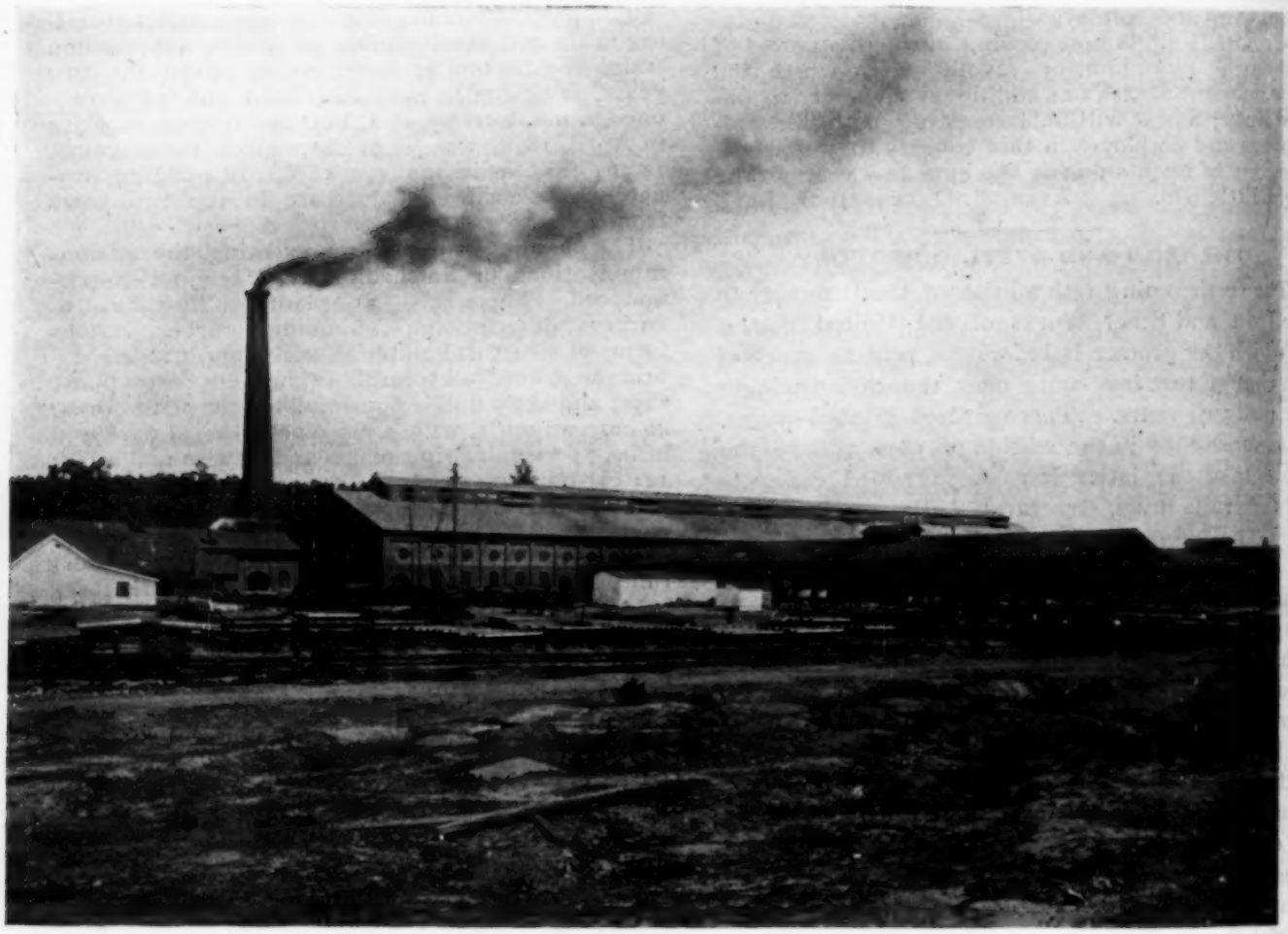

FIG. 1.—AMERICAN PIPE AND FOUNDRY COMPANY S PLANT AT ANNISTON, ALA.

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THE American Pig Iron Storage Warrant Co. had in yard June 20, 262,900 tons of iron, 100 tons having been put in yard and 1,900 tons withdrawn in the preceding 10 days.

## THE TIN PLATE MARKET.

As noted last week, there is no particular interest or life in the market, and the fact that the wage scale has been settled so quickly, insuring against any long shut down, has made the market rather easier. There is now less probability that any shortage for July and August will occur. Demand for earlier deliveries is disappointing as far as new business is concerned, though of course all of the large can makers are receiving quantities of plates on old contracts. These old contracts have been considered insufficient for the requirements of the canning trade during the season, and an active buying movement has been looked for. There seems little probability that such movement will now occur. The market is weak with quotations f. o. b. Pittsburg and Indiana districts as follows:

CHARCOAL TINS.

| | IC | IX |
|---|---|---|
| Calland Grade, tissue packed, | $4.00 | $5.00 |
| Allaway Grade, | 3.40 | 4.30 |

COKE TINS.

| | | | |
|---|---|---|---|
| IC, 108 lb. | Basis weight, | | $2.85 |
| 100 lb. | " | " | 2.75 |
| 95 lb. | " | " | 2.70 |
| 90 lb. | " | " | 2.65 |
| 85 lb. | " | " | 2.60 |
| 80 lb. | " | " | 2.55 |

WORCESTER GRADE TERNES.

| | | | |
|---|---|---|---|
| IC, 216 lb., | 20 x 28 | | $5.80 |
| 200 lb. | " | | 5.50 |
| 190 lb. | " | | 5.40 |

These figures are being shaded on large and desirable business.

---

A BALTIMORE dispatch announces that the Maryland Steel Co. has decided to put its shipyard at Sparrow's Point, in operation again, and to bid for a share of the Government work which will soon be given out. The plant, which has not been in operation in three years, is thoroughly modern and its equipment is of the best.

## MAKING A LARGE STANDARDIZING CASTING.*

BY THOS. D. WEST.

When the writer first conceived the idea of a National Agency for distributing standardized drillings, as outlined in his paper "Need of Greater Uniformity in Pig Iron Analyses," presented to this association last April, he knew that to make this practical, a body of cast iron weighing from 400 to 500 pounds, free from all sand grit or slag, would have to be obtained, as no chemist would accept a sample for standardizing purposes that contained any of these impurities. It was also known that many would question the practicability of making a casting of 400 to 500 pounds that would be absolutely clean, solid and of a homogeneous grain, so that when drilled or turned it would give a uniform sample for standardizing purposes. As a rule, chemists have found it difficult to obtain samples of even 25 pounds weight that would be reliable.

To obtain 300 pounds or more of absolutely clean and uniform drillings or turnings involves experience in heavy founding, but like all else, when once known, it is easily achieved. The plan is as follows: A mold of dry sand for the outer body and a dried core for the inner, are made as seen in the plan and section view at Figs. 1 and 2. The construction of the mold explains itself. The secret of getting a clean, solid casting lies mainly in the method of gating and pouring it. At A is a gate leading down to the bottom of the mold with an inlet at D. The round gates B, seen at the top of the mold, are placed about 4 inches apart and are ½-inch in diameter. A riser is seen at E. In starting to pour the mold, the hot molten metal is directed to drop from the ladle into the basin at the point marked W in a way that will permit it to flow gently down the gate A and enter the mold at D. When from 30 to 50 pounds of metal has entered the mold, a quick turn of the ladle empties a large body of the metal into the pouring basin, quickly filling all the gates at B; this then drops the metal down upon that which is rising from the stream flowing in at D. This action is kept up until the mold is filled and the metal runs out at the riser E. After this point is attained, the pouring is slackened and a steady stream maintained until from 300 to 500 pounds of metal has flown through the riser E to run down the incline seen at S, into the scrap pig hole X. The effect of causing such a large body of molten metal to flow through the mold, by making it enter the gate at A, is to keep up an agitation after the mold has been filled, which in turn will be most beneficial in causing the metal in the mold to mix well and counteract variations in structure that might otherwise take place. The metal dropping from the top gates B causes a disintegrating action, cutting into a fine dust any dirt that might accumulate upon the surface of the rising metal and which, were it not thus chopped up, as it were, into fine particles, would gather in large lumps, to be caught and held fast on the mold walls, with the result that dirt spots, etc., would be found in the casting, when its skin is removed by a drill, lathe, or planer. Again, the fact that the metal drops from the top of the mold, besides entering at the bottom, causes the top body of the rising metal to be as fluid as that at the bottom, which is also beneficial in causing all scum and dirt to float upward with the metal, to the top of the mold or "riser head." Where metal fills a mold all from the bottom, it becomes rapidly duller in rising to fill the mold, an evil which will be readily seen. The writer, in the capacity of both journeyman and manager, has made almost all kinds and weights of complicated and difficult steam, gas and hydraulic cylinder castings, after the plan of gating shown in Figs. 1 and 2, and can say that whenever this plan of gating could be adopted, he has no recollection of ever having seen a bored surface (after the riser head was cut off), that displayed a dirt hole the size of a pin head, so perfectly clean and solid were such casts when finished. The writer is not alone in experiences of this character, as others familiar with heavy founding, who have followed the plan herein outlined, will agree with the above statement. While this article is intended mainly to show the practicability of obtaining 300 or more pounds of uniform and clean drillings, for standardizing purposes, it

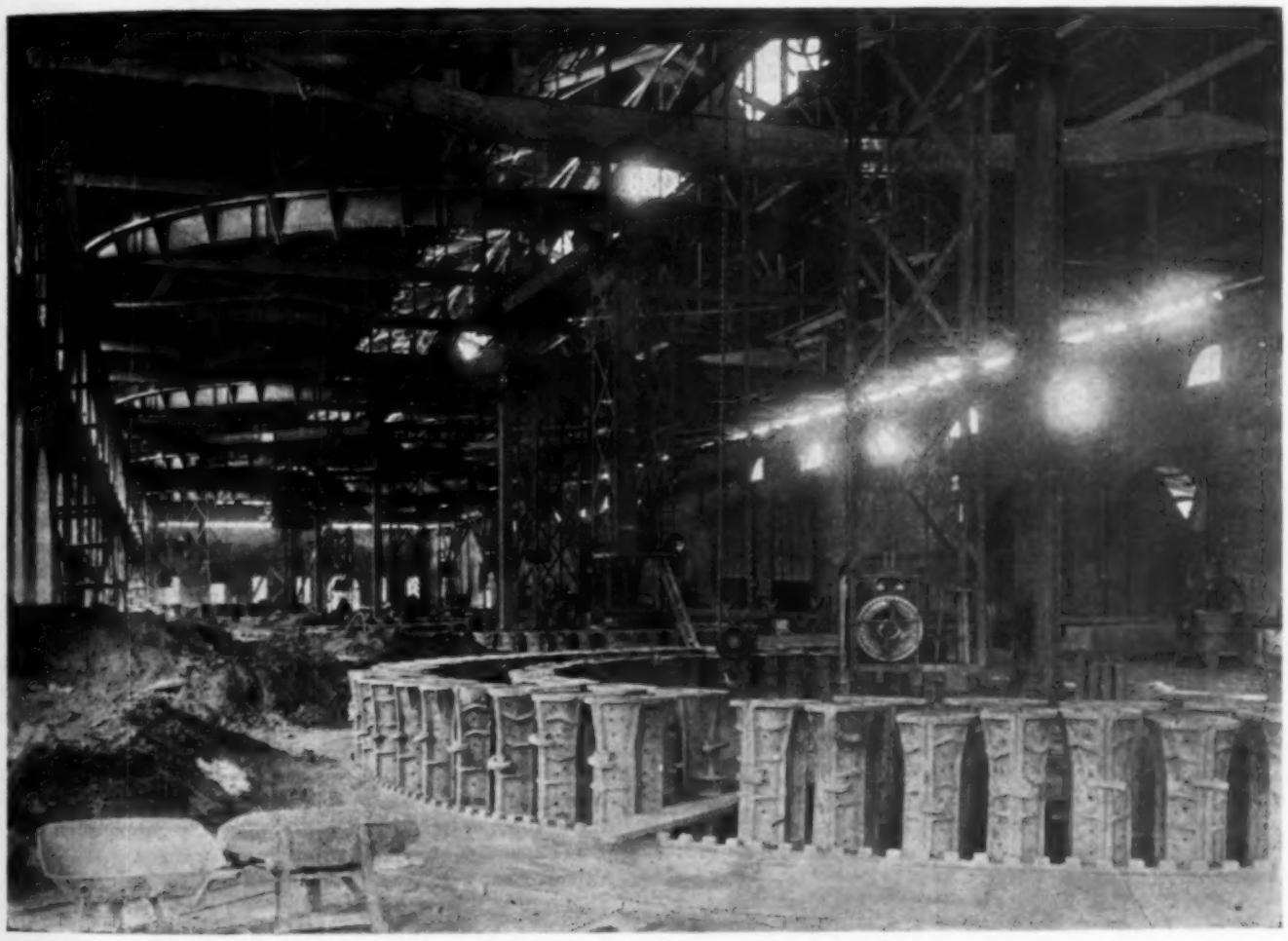

FIG. 2—CRANE SERVICE IN AMERICAN PIPE AND FOUNDRY COMPANY'S PLANT AT ANNISTON, ALA.

* Read before the Pittsburg Foundrymen's Association, June 27.

incidentally deals with practice that will be of use, no doubt, to the general molder or founder who may not have had experience in casting steam, gas or hydraulic cylinders.

Fig. 3 shows a section of the casting obtained from the mold, with the exception of two lugs, cast on to assist in holding the cylinder in the lathe while it is being turned. It will be well at this point to state also that there is no difficulty in obtaining castings running into tons, which might serve for standardizing purposes. The plan of securing these turnings or drillings is first to take off about ⅛-inch from the outside surface. These first turnings are cast aside, as they will contain more or less scale and dirt formed on the face of the casting by the fusing action of the molten metal upon the sand forming the face of the mold. After this surface has been turned off, and all the debris removed carefully from the lathe, the cylinder is turned until about ¼-inch thickness of an inner shell remains. The turnings obtained from the body after the ⅛-inch thickness is removed are the ones taken for standardizing purposes. It should be stated that about one-half inch thickness at the bottom and the "riser head" of two inches at the top are not disturbed, so as not to have the scale on the bottom of the casting or any dirt that would be collected at the top end, mixed in with the turnings obtained from the inner body of the casting. After the turnings have been thus obtained, they are passed through a 40 mesh sieve and thoroughly mixed, when they are ready to be analyzed, or standardized.

The molding and casting of this work is personally over-

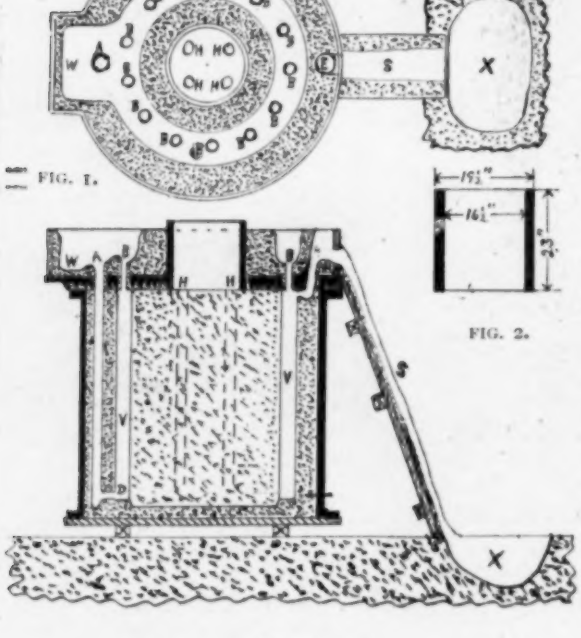


FIG. 3.
MAKING A CASTING FOR STANDARDIZING PURPOSES.

Fig. 1.—Plan of Mold. Fig. 2.—Section of Casting. Fig. 3.—Sectional View of the Mold.

seen by the writer. Two castings are being made, one of Bessemer and the other of foundry iron. The first casting is at this writing in the hands of Prof. C. H. Benjamin, at Case School of Applied Science, who is to manage the procuring of the turnings and the other work pertaining to distribution. Prof. Smith of the same College is to have charge of the analytical work. The reputation of both these gentlemen is a guarantee of the reliability of results. The silicon, sulphur, phosphorus, manganese, and both carbons will be determined and standardized. The methods used for determining the analyses will be furnished with the samples gratuitously to any desiring them. For the sum of $5 a subscriber will be furnished one pound of the drillings of all one kind, or half of each, as he may wish it, delivered to him. One pound should furnish enough material for 36 complete analyses or at least 200 separate determinations. At this writing, June 23, 1898, 30 firms comprising blast furnaces, foundries and steel works have sent in their orders for one pound of standardized drillings, which will be ready for delivery in a short time.

The manner in which this project was received and endorsed by the convention of the American Foundrymen's Association at Cincinnati, the fore part of this month, indicates the necessity and value of having one source from which all could obtain standardized drillings, instead of laboratories doing this work for themselves, as many do. It is hoped that before the close of this year, most of the laboratories dealing with cast iron, whether makers or users, will be subscribers to this central agency. Such an achievement is sure to lessen many of our present grievances and losses due to the lack of a national standard to assist the chemist in checking the results of his personal work, his methods or his chemicals.

## PITTSBURG FOUNDRYMEN'S ASSOCIATION.

The Pittsburg Foundrymen's Association held its last meeting of the year Monday evening, June 27, at the Builders' Exchange, with President Taylor, Secretary F. H. Zimmers and the following members present: J. S. Seaman, Seaman-Sleeth Co.; Wm. Yagle, Wm. Yagle & Co.; Dr. Richard Moldenke, McConway & Torley Co.; Philip Mathes, Brittain & Mathes Co.; B. D. Fuller, Westinghouse Electric & Mfg. Co.; S. D. Sleeth, Westinghouse Air Brake Co.; S. H. Stupakoff, Union Switch & Signal Co.; J. S. McCormick, J. S. McCormick Co.; W. T. Mobberly, Taylor, Wilson & Co.; James Alteman, James Collard; J. J. Gray, J. H. Hillman & Co.; Eliot A. Kebler, Matthew Addy & Co.; J. B. Allen, *The Iron Trade Review*.

The committee appointed to invite the American Foundrymen's Association to meet next year in Pittsburg reported that the invitation had been extended at the Cincinnati convention and that it had been virtually accepted, the matter being in the hands of the executive committee.

Discussion was had on Mr. Stupakoff's paper of the last meeting on "Foundry Appliances." Mr. Stupakoff made some supplementary remarks in the course of the discussion, which was also participated in by a number of members.

Dr. Moldenke submitted the report of the committee on a central agency for preparing and distributing standardized drillings. It referred to the favorable action of the American Foundrymen's Association at Cincinnati on the memorial from the Pitttsburg Association and the appointment of a committee of seven to carry out the work, Mr. West being chairman, and Mr. J. Scott and Dr. Moldenke the two other members thus far appointed. The report added that while the committee's labors really ended with bringing the matter before the Cincinnati convention, it had continued to push the project in the interest of the trade, and was able to report that the outlook warranted the preparation of two standard samples, one of foundry and the other of Bessemer iron, both being under way. The committee added that the work was now turned over to the National committee, and asked that it be discharged. This was done, with the thanks of the association.

A short paper by Thos. D. West, on the preparation of standard castings, was read, as printed elsewhere.

Adjournment was taken to the fourth Monday in September.

## Lake Superior Mining Institute.

The council of the Lake Superior Mining Institute has accepted the invitation of members on the Gogebic range to hold the next annual meeting at Ironwood, Mich. Secretary F. W. Denton announces that the meeting will be held in the third week of August, beginning Tuesday, Aug. 16. Details concerning papers and the itinerary of the meeting will be issued later. Mines at Ironwood and other Gogebic range points will be visited.

A CHANGE has been made in the management of the *Marine Review*, that sterling publication devoted to lake shipping and the marine interests of the whole country. F. M. Barton, who has been associated with John M. Mulrooney in the eight years of the *Review's* career, has sold his interest to Mr. Mulrooney, and the latter becomes sole proprietor of the *Marine Review* and of the Blue Book of American Shipping. Mr. Barton retires to assume the business management of the Gospel News Publishing Co., of Cleveland. Both gentlemen deserve the success they have had in their partnership and which will no doubt attend each in his separate field.

# Review of the Technical Press.

[Translation, Condensation and Comment expressly for The Iron Trade Review by Dr. Richard Moldenke.]

**Preparation of Pure Iron in the Electric Furnace.** [*Zeitschrift für Elektrochemie*, No. 20.]—A new process is reviewed which is based upon a peculiar property shown by melted iron saturated with carbon, when brought into contact with an excess of lime, magnesia, etc. Under favorable conditions this property is to give off the carbon to make a carbide of the alkali earth. The iron is melted in an ordinary furnace; if the carbide is wanted plenty of coke is used. From the furnace it is run into an electric furnace, forming the cathode, while a rod of carbon inserted into the fluid both forms the anode. The proper quantity of the alkali earth oxide is now introduced and the circuit closed. The iron now becomes decarbonized, the carbides are formed, sulphur and phosphorus are liberated and volatilized, and silicon goes into the slag as a carbide of silicon. The melt is now tapped and under the crust of carbide slags there will be found a regulus of pure iron.

**A New Method of Determining Hardness.** [*Baumaterialienkunde*, No. 21.]—Engineer Schmidt, of Munich, delivered an address on the above subject before the International Society for Testing Materials, at the Stockholm convention. The subject of testing metals for their hardness has always been considered one of the most delicate of investigations. The researches of Herz, followed by those of Foeppel, have given the subject a new bearing. The question was to investigate the elastic contact of two bodies having the same properties in all directions (isotropic), their contact surfaces, however, being very small relative to the bodies themselves. The results obtained by Herz, while mathematically precise and elegantly developed, were not applicable to daily practice, and only when special cases, such as the contact of spheres, and of spheres with planes, etc., were studied did we obtain something of immediate value, such as Prof. Weibrauch's calculations of the roller bearings for bridges. Herz defined hardness as the strength by virtue of which a body opposes deformations which are evidenced by a circular plane of contact. The measure of the hardness is the normal pressure which must be exerted upon a unit of surface, situated in the center of the circular plane of contact, in order to produce in some point of the body strains just up to the elastic limit. Now this normal pressure has been proved to be independent of the radius of the sphere or cylinder, and we need not compare with any given standard body either, but as the substances are tested with themselves, so to speak, the measure of the hardness is not relative but absolute. Experiments were carried out by Prof. Foeppel thus: He turned up two cylinders, each of various materials, all of them having a radius of 0.8 inches. By crossing two cylinders at right angles, one over the other, and applying pressure, the circular contact flames of Herz were obtained. The exact time of deformation was somewhat difficult to ascertain in the case of the more plastic metals; hard substances such as glass give a warning sound by cracking. The difficulty was overcome by continuing the pressure after deformation, when it was found that the compression surface grew proportionately to the pressure applied. This discovery relieved the operator from the necessity of watching for the exact moment at which permanent deformation took place. It allowed him also to find the mean pressure per unit of contact surface within the range of permanent deformation, which is taken as a measure of the hardness. These surface values when plotted horizontally, and the pressure vertically, gave nearly straight curves, the angles of which with the vertical were different for every substance tried. Thus several steels were tested while in their commercial state, when annealed, when glass hard, and when drawn to yellow. This last condition was found to leave the steels harder than when they were glass-hard, a fact noted by other experimenters also. It is usually sufficient to observe the compression of the test pieces by reflected light. A little manipulation of the contact surfaces with lamp black, however, will materially aid in detecting the critical point after elastic deformation. The measurement of the contact surfaces can easily be accomplished up to within .004 of an inch, by the use of special micrometers. Mr. Schwerdt gives some curves showing in general how the hardness of steels increases with the carbon contents. He also shows that the diameters of the two cylinders may be increased at pleasure, provided they remain equal for both test pieces. A number of points relative to uniformity of methods in carrying out the process are given, and finally the calculation of results gone into. As the standard experiments were made on cylinders of 0.8 inch radius, for any other radius the results may be recalculated by remembering the fact that the mean value of the pressures obtained are inversely proportional to the cube root of the radii. Thus experiments with phosphor bronze cylinders of .75, .80, and 1.60 inch radii showing a hardness each of 94, 77, and 73 upon recalculation gave 75, 77, and 79, which are certainly close enough. Another series of phosphor bronzes gave exactly 44 for each.

**High Temperatures, and Preparing Pure Metals with High Melting Points.** [*Zeitschrift für Elektrochemie*, No. 21.]—Dr. Goldschmidt, of Essen, describes his method of obtaining high temperatures by means of the heat of combination of aluminum and oxygen. He states that the substitution of sulphides for oxygen, and magnesium or calcium carbide for aluminum, while less effective, also gives serviceable results. The early attempts to utilize this well known property of aluminum are described, and their failure is attributed to the methods employed. Instead of obtaining the reaction throughout the whole mass at once, which means explosions and damage, Dr. Goldschmidt arranged matters so that the reaction started at one point and was gradually communicated throughout the whole mass, thus giving a continuous source of heat. In preparing chromium it was found necessary to add a superoxide of some kind, to enable the operation to go on continuously. Oxide of lead, copper, or permanganate of potassium, served very well, and by keeping the oxide of chromium in excess, a regulus of chromium free from aluminum was finally obtained. By mixing in some iron ore, the charge is attenuated so to speak, and the reaction takes place less violently and more slowly, the intensity of the heat is reduced, and simple heating effects are produced. Thus, a rivet is covered with a mixture of iron ore, sand, and aluminum filings. The mass is ignited by a specia cap made of aluminum powder and some substance giving off oxygen freely, a strip of metallic magnesium inserted in the cap serving as the fuse. By lighting the ribbon the reaction is started and the whole mass is soon aglow. On breaking the shell the rivet will be found white hot and ready for hammering up. Brazing can also be carried out readily in this way, where the use of ordinary appliances would be out of the question. Welds are easily made, and holes in one-half inch iron plates are melted through in very short spaces of time. Coming now to the question of obtaining pure metals, Dr. Goldschmidt describes a new method of making chromium. He takes a mixture of chrom oxide and powdered aluminum, places them in a crucible, lined with magnesia, and starts the operation in the manner described above. More of the mixture is added from time to time, the properties of the ingredients being regulated as to time and quantity as shown by experience. The chromium may be drawn off at one place and the slag at another, and the process thus kept continuous. Practically this crucible is an electric furnace without poles or current. The preparation of 11 lbs. of chromium by the oxidation of aluminum equals the application of 2,000 h. p., the time being very short. The same amount of energy would have been expended to reduce the amount of aluminum used originally from its oxide. The exterior of the crucible remains cool during the operation, hence there is little wonder why the yield of the melt is often nearly 100 per cent of the metal contained in its oxide. Nearly all the metals can be reduced thus, even alloys, such as ferroboron, ferrotitanium, chrom-manganese, chrome copper, etc., can be readily produced. Pure aluminum is of course used where pure metals are desired. For simple heating effects, the 50 per cent crude aluminum of commerce is quite effectual and much cheaper. Aluminum may be rightly called a storage battery of heat, and the thought is expressed that possibly the production of electricity directly from heat may be accomplished through the agency of this wonderful metal.

## HEAVY FORGING MACHINE.

The Ajax Mfg. Co., of Cleveland, recently built a forging machine which weighs 100,000 pounds and is said to be the heaviest machine of this type yet constructed. It will be used by H. H. Hewitt, of Buffalo, N. Y., in shaping the ends of the side frame of the Hewitt rolled steel truck. The rolled section is brought to this machine with the central web sheared out in a V shape to the depth required for the finished piece. The section heated to the proper heat is placed in the machine perpendicularly and clasped firmly by means of a gripping die, after which the plunger advances and finishes the work at one stroke. The machine is belt-driven. It was designed by John R. Blakeslee, and it is claimed several of the features are entirely new and an improvement over anything heretofore used. One is the gripping die which is driven from the header slide by a simple and powerful arrangement. The machine is thrown in and out of gear by means of a foot treadle and the slide is thrown into gear by means of a lock which operates without jar to the machine. This lock is another improvement, and has several advantages over the clutch on the fly wheel which is sometimes used on this class of machinery. The machine is powerfully geared

HEAVY FORGING MACHINE.

and supplied with brass linings and bushings throughout.

The bed plate is massive, and the main shaft is dropped so low as to distribute equally the strains throughout the castings, thus giving it ample strength.

The bed for the above machine was cast in one piece, the casting being an exceptionally large one. The pit in which the mold was prepared was 12x18 feet and 6 feet deep. Six or eight girders were laid cross-wise on the bottom of the pit. These had vertical slot-holes in the ends, through which 1¼-inch bolts were run, with nuts underneath. On the girders plates were laid the full length of the pit, entirely covering the bottom, with the exception of space for the bolts. About four inches of coke or small cinders were filled in, to provide vent through pipes laid up against the side of the pit. Four inches of common sand was rammed solid over the coke. The pattern was put down on bricks, which raised it about three inches above the sand, and facing was tucked under it on all sides. The pattern was then lifted out and the bottom made solid and vented down to the coke. After putting back the pattern, ramming it up to the top and making the joint, the top flask was put on and rammed up, staked and lifted off to trestles, for drying. The lifting of the pattern, finishing the mold with blacking, sleeking with the tool and brushing over with molasses water followed. Iron baskets containing a coke or charcoal fire were lowered into the mold, plates put on to hold the heat, and firing kept up four or five days, or until the mold was thoroughly dried. The cores were then put in and the top flask lowered and nicely adjusted to the stakes, afterward being lifted off to make sure that all was right and that there had been no crushing of the cores on the sides of the mold. Just at this point the greatest care was necessary lest the work of weeks be undone by a trifling mishap. When the flask was finally down to its place, girders, duplicates of those at the bottom, were laid across the top of the flask, and the long bolts inserted in slots at the end, thus bolting the whole securely together.

The casting weighed 60,600 pounds, clean. It was cast with three ladles.

## Syndicate to Control Belgian Mills.

It is stated on good authority that there is a serious movement to organize a syndicate to include the great majority of Belgian rolling mills. The plan is to form a large company, in which each works will be a shareholder. The company is to sell both for export and for the home trade the products manufactured by the different works, which abstain absolutely from any direct sales. According to the plan, this company would also enter into an understanding with similar syndicates in France and in Germany. It is said that under such an organization, Belgium would not sell a pound of iron for less than present prices, and that values could be lifted at once from 10 francs to 20 francs per ton. The object of the sydnicate is to prevent the blind competition which the producers enter into to secure orders. Another advantage would be that middlemen, agents and others, to whom two per cent commission is now paid, would disappear, and this profit would be added to the returns of producers. If this project should be realized, the Belgian iron trade might again see highly profitable days. What make success doubtful is the jealousy among individuals and among firms. However this may be, several prominent men seem to be working sincerely in behalf of the project. A meeting was held last month at the Brussels Exchange, nearly all the mills being represented, and a committee was named, whose duty was to elaborate the plan and report at a second meeting, but the report of this committee has not yet been made public.—[London Iron and Coal Trades Review.

THE Cherry Valley Iron Works, Leetonia, O., will add to the height of their stack, put in new boilers and probably erect new hot blast stoves. More coke ovens will also be built.

## NOTES ON BRASS FOUNDING.*

BY CHAS VICKERS.

Brass founding, like most other trades, naturally divides itself into classes. One foundry makes a specialty of plumbing goods, another of chandelier fittings, while another will devote itself to making machinery castings generally. Plumbing goods comprise, as the name signifies, all brass goods used by plumbers, such as faucets, waste cocks, ferrules, etc. Yellow brass is the metal generally used, and the work is of such a character that the patterns can be carded, namely, attached to match plates or boards, or else "gated," that is, a sufficient number of patterns to fill the standard size of flask, are riveted or soldered to the gate, practically forming one pattern. Both "plate work" and "gate work" have their own individual spheres of usefulness, but the writer believes, from his own experience, that it is better to put the patterns on plates in preference to gating them, whenever it is possible to do so. Bibs and cocks with their component parts, such as plugs, handles, stems, etc., and globe and other valves, the parting lines of which are straight can be all made by the match-plate system, thereby saving the time that would be expended in making matches, trimming the joint of the mold etc., as is necessary with gated patterns.

In order to turn out this class of work to the best advantage, first-class flasks should be provided and kept in good condition. Interchangeable flasks are almost a necessity on plate work, as the plate must fit on the pin halves of flasks, which are used as nowels. A yellow brass called dipping metal, is generally used for chandelier castings. This class of work is mostly light and ornamental in character. Much of this work is skin dried by spraying with gasoline and then burning off. There is quite a knack in pouring, as the metal must be thrown into the mold with force enough to run, and at the same time not strain the casting.

No branch of the foundry business calls for more individual skill on the part of the molder than that of machinery brass work. Not only must the workman be equally at home on floor or bench, but he must be prepared to turn out castings in a dozen different alloys, each of which has its own peculiarities, in changing from the liquid to the solid state, which peculiarities must be humored in the construction of the mold, or trouble will ensue. Some alloys, as for example phosphor bronze, require the mold to be rammed more than ordinarily firm, while in the case of aluminum bronze we must go to the other extreme and ram it exceedingly soft, so that the mold will not resist the excessive contraction, otherwise the casting will be drawn apart. Phosphor bronze shrinks but little, but if poured too hot it will eat into a green sand mold almost like water; to prevent this it is poured cool into such molds. It can, however, be poured hot, provided the mold is well coated with plumbago, and then baked before casting.

Chain guards for ladies' bicycles are a class of work that sometimes cause a great deal of trouble. They are made of aluminum and the trouble is caused by their cracking. After repeated trials, one firm with which the writer is acquainted, made them successfully by soft ramming, gating them with two broad, thin gates on the sprocket-wheel end, and elevating the sprue end six inchse. The metal was thrown in at a dark red temperature, and immediately the copes were thrown off, while the metal in the sprues was yet liquid. On small, loose jobbing work, when there is more than a dozen pieces required, it will pay to make "set" gates, as they save the time consumed in cutting and slicking the gates, besides producing cleaner castings. They are easily made as follows: Make a mold, cut the gate as required, leave the patterns in, close the cope and pour into the gate cavity tin at a low temperature so as not to injure the patterns if they are wood. Should there be any castings previously made from these patterns, draw the patterns and substitute the castings, before closing and pouring the mold.

In making heavy brass work it is advisable, whenever the shape of the pattern will permit, to pour from the bottom exclusively. Take for instance, a brass bushing weighing, say, over 500 pounds. Suppose the pattern is 18 inches in depth, three or four feet in diameter, and anywhere from one and a half to two inches in thickness and has a green sand core in the center. The casting had better be poured with two pots, and gate at the bottom, through runner cores. When the metal will impinge on the green sand core, a piece of dry core is built in to prevent scabbing. The runner which leads the metal from the joint to the bottom of the mold should be about one inch in diameter. From the joint up, through the cope, it is enlarged to between two and three inches in diameter; thus we get metal to feed, and keep the gate solid. A so-called skim gate is used in pouring. About four inches distant from the aforesaid runner with its riser, another runner cuts through the cope, to the joint; it is connected to the riser of the first runner by a horizontal channel cut in the cope. This channel must taper from the runner, to the riser, like a nozzle. It is comparatively small at the junction with riser.

Here is the point where care and judgment must be used. If it is too large it will take the metal too fast, making it impossible to keep the pouring head full, and the scum will enter the casting showing up as dirt. If it is too small it will not take metal fast enough, and the casting may not run, as it is poured rather cool. When pouring, as the pots empty the stream naturally grows smaller; this is another point to be watched or the head may sink, and the whole of the bubbly scum be sucked into the mold. When the head is successfully kept full, this method of gating gives clean castings.

In order to feed and prevent shrinking in the casting we have been considering, it is prudent to put on a riser 3½ inches in diameter. It must not be put on top of the casting, but about an inch away from it anywhere convenient, connected with the casting by a good deep gate, filleted so as to break off hot, without breaking in. Carry the feeder up four inches above the cope. When the mold is filled, cover the pouring head and top of runner riser with sand, bed on a weight, then fill up the feeder head. Shake out while hot, break off feeder and runners, and scrub the casting with a spade.

As the making of alloys of copper is a subject that has been ably and extensively dealt with by writers, and before this association, it would be only repitition to mention the same here, further than to remark, that it is very seldom that the practical metal mixer gets a chance to use wholly new materials. The scrap brass must be used up somewhere, and it is generally cheaper than a new mixture. To use it judiciously, is where the art of metal mixing comes in. The mixer must be able to judge of the quality of the metal in the different pieces of scrap as he sorts them out. Bells, bearing brasses and bushings are, as all practical men know, generally hard brass. Car brasses justly come under suspicion, they are often made of old copper buttons and scrap containing iron. They must be used sparingly in finished work. Valves and small red brass scrap are generally soft, and may be used accordingly. Soft brass may be stiffened by the addition of hard scrap, and porosity guarded against by adding yellow brass scrap.

Scrap metal has a great tendency to make dirty castings; guard against this by cleaning the metal before pouring. Bring the metal from the furnace hot, add the new metal mixture. After stirring thoroughly, scrape down the sides and bottom of the pot, inside, with the skimmer, which had better be a ⅝-inch round iron; stir again and skim off. If the metal is hot enough, there may be time to repeat the stirring and skimming. A surprising quantity of dirt is removed from the metal in this way. When pouring, bridge the lip of pot with the skimmer, holding back all dirt. The writer has made key heads, scaling 30 lbs. each, with only 1-16-inch stock allowed on both sides for finishing, out of common scrap by using care as aforesaid, and not lost one out of sixty.

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THE Lorain Steel Co., Lorain, O., made a contract with John Stang on Monday, to build 900 feet of docks for its new blast furnace plant and do the dredging necessary to give 20 feet of water in Black River, for a distance of 30 feet from the edge of the dock. The contract amounts to over $50,000. A force of 100 men will be employed on the work in the next six months. The docks will be 24 feet wide and will carry two railroad tracks.

* Read at the Cincinnati meeting of the American Foundrymen's Association, June 8, 1898.

## TROLLEY SYSTEMS IN THE FOUNDRY.*

BY HERBERT M. RAMP.

The overhead trolley system is one of the most modern of improvements in the foundry and connecting departments, and bids fair to almost entirely supersede all other methods of carrying and handling light as well as heavy loads. Their adaptability to all kinds of work, the ease with which they can be operated, the amount of labor they can save, and the nominal cost at which they can be erected, have opened a wide field for their use, and it can be truly said that when properly erected there is no machinery placed about a foundry and machine plant that can demand better claims to being classed as "labor saving" and "dollar saving" machinery. This is the evolution of the crane, and the trolley system is gradually crowding these clumsy, ill-looking, room-consuming creatures of the past to the wall, and while there have been wonderful improvements in our cranes, they cannot expect to equal the modern trolley system. The advantages of the same are great, and a few of its good points are as follows:

First, it will cover more territory at a lower cost; second, it will work quicker than any crane built; third, it can be operated more easily and with less labor than a crane; fourth, it can be erected and operated in places where a crane could not; fifth, it is maintained at a lower cost for repairs than cranes; sixth, it is unlimited. You may extend it to any length or over any space you desire at any time, while a crane is complete within itself, and when more room is required, you must build a new and separate crane; seventh, it consumes no room like a crane does. The entire track is hung from the roof or supported by columns, while a crane swinging in a circle has at least a 15-foot circle in the center that is useless, and does not reach the corners; eighth, it requires no heavy foundation and is not a strain upon the walls of the building, pulling them out of shape with the roof also, as many a crane has done. When used in conjunction with air-hoists and compressed air, there is absolutely no question as to its value, and any concern that does work which requires any amount of heavy lifting or crane work, can pay for the entire expense of erecting a suitable system in one year's time by the labor saved and confer a favor of no small proportions upon their men by relieving them of the heavy, hard, laborious part of their duties.

How many have stepped into foundries, those who are conversant with the business, and watched the great, cumbersome 20- or 30-ton traveling crane expend its force, time and wear on machinery to lift a little casting or flask that would not weigh over a thousand pounds, while other men stood waiting for it, consuming twice the amount of labor and time a good trolley system would? Is this economy? True, the heavy crane has its place, but there is much more light lifting and handling than there is heavy, and the wideawake, progressive foundrymen of the day will make other provision for handling light loads quickly and cheaply. We have seen molders and helpers stand for ten minutes around a large flask waiting for a lift because there was no room under the crane, and such work had to be made on the side floor anyhow because the crane was so slow. How many foundrymen ever stop to figure what that lift cost and what it would cost if he had a trolley system and compressed air, so one man could handle it himself; and how many such lifts are made in a foundry in a year? If you do, you will find the figures surprising. You have noticed men pulling and struggling to get heavy cores from the core room to their molds. Yes, and we see a dozen places every day around a foundry where this device would save labor, money and time.

Trolley systems can be erected to run from the cupola or standing ladle direct to the floors, and ladles holding from 600 to 1,500 pounds of iron easily handled and poured by the molders, saving the labor of helpers to carry the small ladles, and being a great advantage in being able to more nearly put the exact grade of iron in each class of work than when carried by hand. It also reduces confusion in the shop at casting time, for fewer men are required to handle the iron and fewer ladles are in operation at one time, and last but not least, your men will end their day's work fresher, be able to accomplish more of it and do it better, because their physical abilities will not be exhausted by the hard, hot labor of carrying iron. If it is expected for men to do more work or better work, and the condition of times and nature of competition make this a necessity, take the hard labor from them, the heavy lifting, the wearisome iron carrying, and you instantly put them in a condition to do more work and also to do it well.

These same tracks can be utilized for all kinds of crane work, any number of trolleys can be run upon the tracks, and every molder can have a crane to himself and never be put to the trouble of waiting or changing rigging. The tracks can be run to the core room, and all heavy cores handled direct from them to the molds, also saving the coremakers an immense amount of time and toil by having facilities there to handle the heavy cores and plates. This same system can be run to the cleaning room and the castings removed from the foundry by its use, and from there direct to the machine shop. In fact, in many places around such plants the thing can be utilized to a wonderful degree.

The Crescent Iron Works, at Springfield, Mo., recently erected a trolley track outdoors for the purpose of loading and unloading cars. It was composed simply of a number of columns 24 feet high set in V shape inverted, which carried a 15-inch "I" beam, upon which the trolley runs. A 16-inch air hoist six feet long was attached to the trolley. This was comparatively a cheap structure and will pay for itself the first year of its operation. Formerly when an engine or boiler was to be loaded, or any machinery or castings, it was accomplished by hand. Now it is run under the trolley track on a truck and four- or five-ton loads are picked up and loaded on the cars by two men in almost at few minutes.

There are a number of different styles of trolley systems, many of which are good, but the double rail is always preferable. In the April and May issues (1896) of the *Foundry*, the writer showed several different types, one with wrought iron rails and cast iron hangers, and the other with both cast iron rails and hangers, both of which have been tried by hard service and found very satisfactory. These tracks cost about $1 per foot erected. A Western concern about four years ago put in 400 feet at a total cost, including switches, of $400. This was principally used over heavy side floors and on light crane work, and the saving in labor, including carrying iron, is fully $400 per annum, or the cost of the structure. It covers eight floors and is not used on all of them at one time—will not average over four constantly—which makes this facility worth $100 per annum per molder when in use constantly. It is not safe to assume that every investment of this character will yield 100 per cent profit in a year, but it is safe to assume it will return not less than 30 per cent per annum.

The Murray Iron Works, at Burlington, Ia., the Atlas Engine Works, of Indianapolis, Ind., use similar tracks, and from observations as to the use they put them and their probable cost, it is perfectly safe to say they pay 50 per cent per annum.

The Coburn Trolley Track Mfg. Co., of Holyoke, Mass., manufactures an overhead trolley system. The track is of steel and must be very light and durable, and is one of the neatest and enduring in appearance of any track ever placed before the market, and while the figures are not at hand, it surely cannot be very expensive. Their catalogue shows it in various places operated for different purposes, and also shows the trolleys and their construction. This part of their system is especially noteworthy, as when they desire to carry heavier loads, they do not add all the necessary requirements to the weight of the track, but extend the length and add to the number of wheels in their trolleys, spreading the load over a greater area of track.

There is little question as to the cost of such an improvement. The actual value of the thing, the profit it brings, speedily sets the question of first cost aside, and the great consideration is—how much do you need? It is a very difficult question to answer how much money so much track will save, or how many men so much track will supplant. There are places where $50 worth of track will save the labor of one man constantly. There are other places where it will require four or five hundred dollars' worth of track to save an equal amount, but it is true that wherever anything has to be handled by crane, wheelbarrow, truck or hand, the overhead trolley will speedily pay for itself and prove its value. Put this track over the floor of a molder doing heavy side floor work and what does it save? First, the man does his own lifting. You save his time and others' who would have helped him. Second, he pours off his floor and saves the customary man to help carry off, and last, he shakes out that dirty, disagreeable part of the business. You have saved money, time and your man. Whenever anything has to be moved, it can be accomplished quicker, cheaper and in a more satisfactory manner by this system than any other way.

The writer does not intend in this paper to say anything regarding the details of construction in these systems, but simply desires to show that the ultimate benefit derived from trolley systems in dollars and cents is so great that no concern doing a large or growing business can afford to permit this valuable adjunct to their plant to pass unnoticed.

* Read at the Cincinnati meeting of the American Foundrymen's Association, June 9, 1898.

## ENDLESS OPEN PAN CONVEYOR.

The question of the economical handling of gritty and abrasive material, such as ores, broken stone, gravel, sand, etc., is one of general interest in the mining fields, and many methods are employed. The Jeffrey endless carrier system, illustrated herewith, has some special features that merit consideration. It is made up of a series of steel pans arranged with carrier wheels and of a type to interlap when fastened to the chains which run along parallel with the pans, the pans being secured to them by means of a stationary shaft to the special attachments in the chain. Particular emphasis is laid upon the dumping or discharge arrangement. In most pan conveyors, the material can only be discharged at the terminals; with this one the load may be discharged at any point along the run-way by the introduction of the tripping device shown. Usually this style of conveyor operates upon angle iron run-ways, although other constructions are permissible. In the illustrations, Fig. 1 shows the run-way intact; in Fig. 2 it is open, the change being made by simply withdrawing the hinged iron track or gate.

FIG. 1.—ENDLESS OPEN PAN CONVEYOR.

In operation, these truck pans follow the curvature of the track, and in the open position discharge their load automatically, again taking up their position in the endless trough on the run-way. Motion is communicated by sprocket wheels, located at the terminals, engaging with the chains along the side of the pans, while the truck wheels are guided around the terminals by following a curved iron run-way. This keeps them in position upon leaving and entering the roadway. But little power is required to drive the conveyor, as both the loaded and return sections are carried upon the truck wheels, which have special oiling devices and thus the amount of power is reduced to a minimum.

This carrier system is applicable in many industries and is built to suit the requirements. The manufacturers are the Jeffrey Mfg. Co., Columbus, O.

FIG. 2.—ENDLESS OPEN PAN CONVEYOR.

### Large vs. Small War Ships.

One argument that has been made in favor of building a comparatively large number of small warships rather than a smaller number of large vessels, with large crews, is that the smaller ones afford the greater number of independent commands and opportunities of training for command. Between 1872 and 1883 76 sea-going fighting ships were launched for the British navy, varying in displacement between 430 and 2,000 tons, and the number of men and officers in these ships ranged from 59 in the smallest to 220 in the largest. These ships were to be found all over the world. Admirals, captains, and leading officers of to-day were all trained in them, and splendidly trained. These ships, however, have been displaced during recent years by larger vessels, with larger crews, making, for each command, larger claims on naval estimates and on the reserve of men. Some of the foremost authorities now lean to the opinion that too much trust is placed in big ships and guns, and too little in the skill, enterprise and valor which may be had in the direction and management of a ship of moderate size. To multiply such smaller ships is to multiply the chances of getting good men in command. Piling up armor and guns condemns many such men to subordination to their inferiors. —[Cassier's Magazine, for July.

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THE 1898 Blue Book of American Shipping has just come from the press. It contains 575 pages, 100 of which are filled with illustrations. It is bound in blue cloth and the edges are stained red, white and blue. The American Flag adorns the cover and some 30 of the representative vessels of the United States Navy, with particulars of all, are included among the illustrations. Evidently no expense has been spared in making complete and correct the list of lake vessels with their particulars, owners' names and addresses, etc. The statistics of lake commerce and information of lake shipping are complete, answering practically every question that arises in connection with the business. The cost of operating lake steamers, particulars of dock equipmentand a directory of Government officers with whom marine men have business, add to its value. Over 60 lake vessels are shown and portraits of 130 lake marine business men are reproduced. The *Marine Review*, Cleveland, is the publisher. The price is $5.

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THE interesting statement is made in a Pittsburg paper that the shipments in and out, of the Carnegie Steel Co. in a recent year were equal in tonnage to 85 per cent of the Illinois Central's total freight business in the same year. No figures are given.

## STRIPPING PLATE MOLDING MACHINES.*

BY E. H. MUMFORD.

The development of the modern molding machine may be said to have extended its use while specializing its offices. For illustration, most ingenious and efficient special machines mold nearly all kinds of gears with accuracy and speed, thus carrying the use of molding machines into gearing in a way that would have been impossible to the general machine, built for the ordinary demands of molding; yet the machines have no application to the general run of work. The same may be said of machines for molding pulleys, and of other special refinements of the molding machine to suit special cases. Having to do, in our practice, with machines for general work, aiming at maximum speed with greatest perfection of molding, it is the intention of this paper to deal with the problems occurring in this field.

The builder of molding machines to-day, if he cares for anything more than "getting his machines in"—perhaps to come out like a blunt axe struck into rock maple—studies, if not every individual casting, to fit a machine to it, yet the import of each casting to the performance of the machine, and adapts his machine to the work made up of individual castings in any shop he enters.

It is, therefore, impracticable to speak, except in a most general way, as to what is the limit of machine molding in any direction. There has been chosen above for an illustration of the special application of molding by machinery the segment gear molding machine. Obviously it will not make anything else, and, *per contra*, no other machine will mold gears, especially wide spur gears, as well, unless from an entire pattern, which, in stripping plate machines, cost at the rate of special cut gears, two gears, an internal and a spur gear. In fact, in general, a job of gear molding is well out of the stripping plate field, especially so when we come to rather flat bevel gears, as these must be rapped just in the right way, not too much, to draw the teeth at all, the stripping plate being without effect except at the ends of the teeth. A small skew bevel gear casting which I have here will illustrate my meaning, and will, I think, be acknowledged impracticable with a stripping plate. Most gears now molded on stripping plate machines, except the teeth are excessively closely pitched, can be handled at much less pattern cost in vibrator machines than in those employing the stripping plate.

There are only two things to be said uncomplimentary to the stripping plate, and they are facts. Otherwise the stripping plate is an ideal method of molding work not having excessively sharp detail on pattern surface. The two facts are that stripping plate patterns cost a good deal, and that they wear out rapidly.

All sorts of attempts have been made to lessen the cost of making up this wear, such as wooden stripping plates, iron plates with babbited edges next the pattern, etc., and these are good as far as they go, only that they leave out of the count the wear of the pattern itself, which, of the two, wear of plate and pattern, is far the more serious in its result. When your stripping plate is worn, it is time to look to your pattern, and the refitting of plate alone is a good deal like the practice of closing brasses on a pin. You take out the slack between plate and pattern, you take away the knock at the pin. Your pattern keeps approximately the same shape, your pin may stay round, but both pattern and pin get smaller.

A pattern for a brake shoe, a tie plate or a sash weight, will stand this longer than a pattern for a machine part, but they all become thinner as age creeps upon them, and we all know how cheap and easy it is to mend a roof and keep it leaking, patch a boiler and miss it entirely some day, even to keep a minister and lose a congregation. As an illustration in point, I would quote from a letter just received from John C. Meloon, the able mechanical superintendent of the General Fire Extinguisher Co., at Providence. Mr. Meloon has been making the brass castings for the yokes and bodies of the Grinnell automatic sprinkler for years on stripping plate machines, which he has recently baandoned. It occurred to the writer that Mr. Meloon's experience with stripping plate patterns in constant use would be more conclusive than anything he might cite generally from observation, and Mr. Meloon has very kindly placed him in possession of actual figures. He says:

"In making our sprinklers, we have taken from our draw plate machine 256,000 molds, and, in taking this number of molds from the machine, we have used up four plates, making an average for each plate 64,000 molds, and that is getting out of the patterns all that was possible for us to get. The last molds we took from this machine were far from being satisfactory, due to the excessive wear on the patterns and the draw plates. Our work commenced to be unsatisfactory after we made the first half of the 64,000 and continued to grow worse until we were obliged to renew them."

These patterns were in continual use, the patterns of brass, the plate of cast iron. To illustrate what these figures mean, we will consider another machine, or rather a pair of machines, using split brass patterns fitted to flat plates, and drawn by a vibrator. Each of these machines has a set of patterns on it, and each is run by one man. One man makes copes and the other man makes drags, so that each set of patterns is drawn half as many times as in Mr. Meloon's machines, for the same number of molds. These men have averaged for a year now 1,800 molds per week, setting 12 cores in each. This, as far a these patterns are concerned, is equivalent to 900 molds from Mr. Meloon's patterns. 32,000÷900=36 weeks approximately, or about 9 months, when stripping plate patterns would have begun to give bad work. Yet the joints of the castings from the split patterns on the vibrator machine are as good after a year's run as they were at first, and will be after 10 year's run, the only wear shown by the patterns being from an excessive use of a brush in cleaning, which has rounded some corners on tops of same. The joint is where the worn stripping plate shows its hand. When a stripping plate pattern is played out, both it and the plate are scrap, generally, and a few figures from actual practice will be interesting.

Ninety-six sets of stripping plate patterns were under consideration. Competitive bids for supplying them were opened. In round numbers the highest was $9,000, the lowest $7,000. It was decided to put in vibrator machines, and split patterns on solid plates. One hundred sets of patterns were made ready for the machine, plates, patterns and all, and the cost ran inside $2,250. Incidentally, it may be noted that, in this case, the patterns and the machines to use them, yes, and the air compressor to run the machines, were all started running regularly for less than the stripping plate patterns would have cost—very much less.

Not an unimportant element in the difference of cost is the ease with which split patterns may be fitted to the plates in perfect "match." Again I would quote from Mr. Meloon, who says: "We have put on plates five sets of patterns in one day, when there have not been over six patterns in a set. This does not include the making of the wooden gate and finishing up the metal one, and drilling and screwing it on to the plate. This requires from four to five hours to do. Of course you understand that if we plated only one set of patterns at a time, it would require more than one-fifth of this time, but by carrying along several sets at a time, there is a considerable advantage."

The figures given above by Mr. Meloon assume the patterns ready to go on the plates, and the plates planed ready to receive them.

Independently of costs of machines and patterns, some queer things happen in foundries using molding machines. On any machine, from the squeezer up, not all the gain is found on the machine itself. Like a good neighbor it raises the standard of the community. Machines of all kinds have had the effect of stimulating to greater effort, especially to an expansion of the "day's work." In fact, a machine can be seen within a thousand miles of Boston, in a shop with smaller machines, which has never been started, the work it was purchased to do being still performed by hand. Yet the owner of this machine is perfectly satisfied with it (you see the machine has not had to work into favor, as is the lot of most molding machines), and he considers this machine, which cost $5,000, one of the best investments he ever made, so great has been the gain in output from the floor molders under the influence of the idle machine, and its unspoken and unaccepted challenge to greater speed.

This is one way of using a molding machine, but there are

* Read before the New England Foundrymen's Association, at Boston.

others. In fact, if the builder of molding machines could ever tell in advance how his machine would be used, sometimes he would build it, and sometimes he would not. For example, there's one of our machines which has never been fitted with proper sized flasks, in a shop where it is run by one man who gets about 30 to 40 flasks with two three-inch plugs for stop cocks in each, hence has two cores to set. In another shop such a machine is run by two men who set eight cores for inch elbows, and make 320 flasks per day. This is merely a difference in shop spirit, but there are other elements in the use of molding machines than the will which impels the deed. There's the old question of Mahomet and the mountain. As the quantity and size of work increases so does the mountain of sand and flasks; and the point is soon reached where the mere handling of material is as important as the speed of molding. Unquestionably the use of a sand conveyor increases the speed of working a machine, if the conveyor is arranged to properly fill the flask, inasmuch as it may save the operator's time. This, however, is not the solution of the whole problem. When flasks reach the size where a crane or hoist of some kind is needed to handle them, and men who might be employed at the machine are momentarily required for the crane, it becomes a question whether it pays to carry everything to the machine, and then carry it all away again. These conditions are most frequently met in cases where flasks are barred and patterns are deep. In such cases, it is impossible to put the sand in so that it will fill up under bars, or ram it by any kind of machine so that deep pockets will get the same effect in ramming as shallower areas, nor is there the least ramming under the bars. The mold must be to such an extent tucked, gaggered and rammed by hand that putting it under any machine ramming is often perfectly inutile except to deceive the fatuous champions of expensive machines for this purpose. Just where it pays to stop machine ramming it is hard to say. As a rule, large machines are suited to special lines of work, and the nature of the work must determine the machine.

Among the most efficient machines in use are machines fitted with either vibrator or stripping plates, mounted on wheels or handled by hoists, on which all the ramming is done by hand, the machine simply drawing the patterns. These machines are generally of comparatively large area, are of light construction and much more readily moved once as work advances than sand and flasks can be moved twice, to the machine and away again. In some work, the sand in pockets is so deep that it is hopeless to attempt to draw patterns down, and have the sand stay up. For such work very efficient machines are made to roll the pattern plates over and draw the patterns up as in hand molding.

So we see that, in molding by machinery, as in any other manufacturing process, the tendency of the age is to suit machines to the work, and the most successful machine, from the machine builder's point of view, is the machine which, though built for general use, yet embodies elements so well designed as to enable it to cope with work of any reasonable difficulty, and let it be understood that nothing in this paper is aimed to prejudice against the use of stripping plates where such are advisable. Our company still builds stripping plate machines occasionally, and it has been the sole motive of the writer to give to you, unbiased, the best light we have through the smoke and dust of the foundry. There are, finally, some facts which it is well for not only the user but the seller of molding machines to keep in mind, and these may be summarized by a very poor adaptation of a familiar aphorism:

You can mold some kinds of castings on all machines,

You can mold nearly all kinds of castings on some machines, but

You can't mold all kinds of castings on any machine—as yet.

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CALDWELL & JOHNSON, who purchased the patterns and patents of the Smead Foundry Co., Toledo, O., will carry on a general foundry business, having secured a lease on the plant. A patent underfeed for furnaces will be manufactured.

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THE General Electric Co. will ship in a few weeks the first consignment of the electric locomotives to be used on the London underground railroad.

## DEEP WELL STEAM PUMP HEAD.

A steam pumping head for deep wells is shown in the illustration herewith, being especially designed for non-flowing artesian or tube wells, where the water does not rise within drawing distance of the surface. It has been employed with success to raise water from very deep wells. The pump bucket discharges on the up-stroke and the top plunger, shown in Fig. 1, discharges on the down stroke, making the flow of water steady and continuous. In making repairs, the key, cross-heads and three of the bolts may be removed from the base. The pump then revolves on the fourth bolt entirely to one side, allowing sufficient room to withdraw rods and working parts. All parts are heavily made and carefully put together. The steam valve motion is simple and durable, and the cushion valves admit of even regulation of the stroke.

FIG. 1.—STEAM PUMPING HEAD FOR DEEP WELLS.

FIG. 2.—BRASS CYLINDER FOR ARTESIAN WELLS.

Fig. 2 shows a brass cylinder intended for use with steam working heads of the type shown in Fig. 1. The barrel is made of heavy seamless drawn brass tubing with cast brass top and bottom attachments which are threaded for standard wrought iron pipe connections. The plunger and lower valves and balls are bronze metal. The cylinder, being of smaller diameter than the pipe, will admit of plunger and lower valve being drawn up without disturbing the pipe connections. Valve stems, valve rods, couplings and the lower end of the plunger are all made with standard wrought iron pipe threads. These cylinders can be used in wells 2,500 feet in depth. The manufacturers are the Barnes Mfg. Co., Mansfield, O.

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OTIS, HOUGH & Co., dealers in Iron and steel, Cleveland, announce that on July 1 they will move their offices from 406 and 407 Perry-Payne building to rooms 321, 322, 323 and 324 Cuyahoga building, where they will have larger quarters and better facilities.

## MANGANESE IN CAST IRON.

The following brief paper on "Manganese in Cast Iron and Some Experiments Thereon," was read by Guy R. Johnson, of Embreville, Tenn., at the Cincinnati meeting of the American Foundrymen's Association:

While making high manganese iron—i. e., 2.50 to 3 per cent—the writer was led to make the experiments which follow, and which may, it is hoped, prove the starting point for practical work along these lines. Our ordinary method of sampling the cast iron as it runs from the furnace is to pour a small chill every three beds, cool, break in two and take equal portions of the drillings from each, these drillings being then thoroughly mixed, to get as nearly a perfect average analysis as possible. With ordinary iron of the same silicon contents, 1.50 to 2 per cent, and manganese of about 0.80 to 1 per cent, these samples can be cooled with safety, and very rapidly as soon as they reach dark cherry red or blue heat. We found it impossible, however, to treat the high manganese iron in this way, because it was made so hard that not even Mushet steel would drill it.

To test this the writer sent some samples to Dr. Henry M. Howe, for testing as to hardness by his method of scratching with a diamond point. The results follow, with analyses appended:

| | Razor. | No. 11. | No. 10. | No. 12. | No. 16. | No. 17. | No. 18. |
|---|---|---|---|---|---|---|---|
| Hardness, maximum | 1.40 | 2.49 | 3.51 | 2.95 | 3.18 | 3.58 | 4.75 |
| Width of scratch, minimum | 1.68 | 1.41 | 1.84 | 2.03 | 2 17 | 2.13 | 2.62 |
| Average | 1 233 | 1.84 | 2.343 | 2.400 | 2.700 | 2.865 | 3.580 |

| | Silicon. | Sulphur. | Phosphorus. | Manganese. |
|---|---|---|---|---|
| 1,321 | 1.44 | 0.01 | 0.178 | 3.68 |
| 1,315 | 1.44 | 0.009 | 0.207 | 0.88 |

A glance at the table shows that the high manganese iron is very much the hardest. The next question was, What practical use can this be put to?

As there was at that time a discussion going on as to the relative value of various brake shoes, the writer determined to test the high manganese iron with a view to getting an iron that should be at once hard, yet not so hard as to wear the wheel too much, and at the same time should be tough.

The following are the results of the experiments, and while they are incomplete, yet they afford a basis for future work along the same line by members of this association, who have more opportunity and time for such work than the writer:

Experiment first.—Brake shoes, Christy pattern, run direct from furnace and cooled, respectively, one at red heat and one at blue heat, and one unchilled. (All tests were made by putting the brake shoes concave side down on the table of a 50,000 pounds testing machine and pressing down until the point of breaking was reached).

Cast No. 1,322, direct from furnace.—Silicon, 1.22; sulphur, 0.011; phosphorus, 1.85; manganese, 3.61.

No. 1, chilled at red heat, broke with considerable toughness—i. e., no sudden snap—at 14,600 pounds.

No. 2, blue heat, defective.

No. 3, unchilled, broke at 15,300.

Fracture in all these open and with some flaws.

Naturally, this was not satisfactory, so to establish a standard a mixture of our strongest iron, giving tensile results of about 25,000 pounds, was used, and the experiments transferred to the foundry. The special iron, or machinery iron, as we term it, brake shoe, with an everage analysis of silicon, 1.25; sulphur, 0.020; phosphorus, 0.189; manganese, 0.75, gave results as follows:

Chilled at red heat, defective, cracked.

Chilled at blue heat, sound, 26,650.

Unchilled, sound, 21,500.

The chilled shoes, however, broke with a sharp snap, showing no toughness, but great transverse strength.

Test No. 3.—Cast No. 1,316. Silicon, 1.96; sulphur, 0.024; phosphorus, 0.189; manganese, 2.92.

Melted in foundry.

Cast against chill plate, 21,000 pounds.

Chilled at red heat, 19,500 pounds.

Chilled at blue heat, 23,600 pounds.

Unchilled, 22,600 pounds.

Several other tests of the same cast showed that the high manganese iron chilled at blue heat gave uniformly the same results. The pieces chilled against an iron plate were tried for the writer by the Southern Railroad, but while showing toughness were too soft.

The shoes chilled at red heat were too brittle and so hard that they could not be touched with a drill, which, of course, indicates that they were too hard for practical use, but those chilled at blue heat showed greater toughness than the ones made of our strongest iron; although not so strong, they drilled with great difficulty and the resultant drillings were very fine—nothing more than powder, in fact. Unchilled, the shoes were much too soft. In short, the sum of the results seemed to be that very great hardness, with good strength and toughness, might be obtained by using high manganese iron and chilling at blue heat.

Dr. Howe's experiments show how much harder than ordinary iron this alloy is, and it is sincerely hoped by the writer that practical use can be made of the idea.

## Test Bars Should be Made as Castings are Made.

TO THE EDITOR:

There is a deal of controversy in the mechanical papers these days and in technical associations, in regard to making test bars. This agitation is all right, but I cannot say the same of some of the propositions advanced. To illustrate: We can secure an order for a lot of castings providing we can get iron that will stand, say, from 30,000 to 40,000 pounds. The castings are to be made horizontal. Why not have the test bars made the same way? But we are told that will not do; that they must be made in dry sand with cleaners and risers all around them, and cast on end. We all know that a casting made in dry sand is supposed to be stronger than one made in green sand, and thus the proposed method of making bars does not give the casting a fair show. I hold that if test bars are to be made to show the strength of castings, they should be cast either on end or flat, the same as the casting, or cast on the castings and then cut off or broken, just as we used to cast test pieces on car wheels.

THOS. WATHEY.

Cleveland, June 22, 1898.

## An Ore Freighter on Schedule Time.

Recent achievements would indicate the development of precision in the operation of lake steamers to the point of a near approach to railroad trains in the matter of observation of schedule. One of the more remarkable accomplishments along this line is to the credit of Capt. C. R. Cleveland, of the Cleveland Rolling Mill Co.'s steamer, William Chisholm. The Chisholm has so far this season made nine trips from Marquette to Cleveland with ore, in addition to one trip at the opening of the season from Chicago to Buffalo, and on every one of the nine trips the steamer has loaded in Marquette on Monday and unloaded in Cleveland on Thursday. An indication of what is being done by all the vessels this season in the way of large cargoes, is shown by the last load of the Chisholm. She is now regarded as a small vessel, but on her last trip she brought down, on a draft of 16 feet 6 inches forward and 16 feet 5 inches aft, a cargo of 2,375 gross tons of ore—a larger cargo than she ever before carried. In speaking of the regularity of the company's carriers President William Chisholm, of the Cleveland Rolling Mill Co., said the other day, that when waiting for one of the fleet at Marquette one day last summer he was amused to hear the hotel porter remark: "That vessel will be here on time, all right. She has arrived at 7 o'clock to the minute for the past six trips."—[Marine Review.

AT Moorhead Bros. & Co.'s mill, at Sharpsburg, Pa., a test was made recently of the Walker smokeless heating furnace. After being in continuous operation for 12 weeks, the results showed 2.79 pounds of iron heated per pound of coal used, as against 1.74 pounds of iron per pound of coal by using the same furnace with the old method of firing. In the same works, the Walker puddling furnace, on a week's test, showed 1.52 pounds of iron per pound of coal. The average amount produced is a ton of iron for 33 bushels of coal.

JAMES G. DORNBIRER, of 46 S. Water st., Cleveland, is finding an increasing business in his specialty, the overhauling and rebuilding of tool machinery. Recently he has built two gear cutters for the Grant Gear Works, designed for spur or bevel gears up to four feet in diameter. Mr. Dornbirer is a graduate of Rose Polytechnic Institute, Terre Haute, Ind.

## STEEL WORKS OF THE UNITED STATES.

In the advance sheets of the summary of the 1898 Directory to the Iron and Steel Works of the United States, the following resume is given of the data contained in the Directory relative to the steel works of the country:

Bessemer Steel Works.—The total number of completed Bessemer steel works in April, 1898, including two Clapp-Griffiths plants and one Robert-Bessemer plant, was 45, with one works projected, against 50 completed works in January, 1896, and one works that was then partly built. Of the works described in 1896, we have transferred to the abandoned list the small basic Bessemer plant of the Buffalo Iron Co., at Chattanooga, Tenn.; the Robert-Bessemer plants of the Chester Steel Castings Co., at Chester, Pa., and the Fowler Foundry Co., at Chicago; the Walrand-Legenisel plant of the Potter & Hollis Foundry Co., at Chicago; and the Clapp-Griffiths plant of the Oliver Iron & Steel Co., at Pittsburg—five plants in all. The plant that was partly built in 1896 was the Robert-Bessemer plant of the Union Steel & Iron Co., at St. Joseph, Mo., which we now also transfer to the abandoned list. It will be observed that the "little" Bessemer plants have not grown in favor in this country and are rapidly disappearing. The 45 Bessemer plants which are described in the present edition contain exactly 100 converters, against 109 converters in the 50 plants described in 1896. The annual converting capacity of the 45 plants of 1898 is 10,633,000 gross tons, against 9,602,450 tons in 1896. No new Bessemer steel plants have been built since January, 1896. The new plant that is projected is that of the Woodsons Steel Co., on the Monongahela River, 24 miles above Pittsburg.

Open-Hearth Steel.—In the Directory for 1896 we described 88 completed open-hearth steel plants and in the present Directory we describe 99 completed plants. In 1896 there were 225 open-hearth furnaces, 17 building, and three partly built; total, 245. In April, last there were 281 furnaces, two building, and three partly built; total, 286. The annual capacity of the open-hearth furnaces, built and building, in ingots and direct castings, in April last, was 3,522,250 gross tons, against 2,430,450 tons in 1896.

Basic Steel.—In the present edition of the Directory we have been able to indicate the character of the product made at our open-hearth steel works, whether acid or basic steel, or both. Of the 99 completed open-hearth plants in April last, 43 were prepared to make basic steel, and of 10 projected open-hearth plants at that time, a majority would probably make basic steel. The prominence which basic open-hearth steel has attained in this country in very recent years is shown in the statistics of our open-hearth steel production in 1897, when we made 1,075,689 tons of basic steel and 556,154 tons of acid steel. The Troy Steel Co. is prepared to make basic Bessemer steel.

Open-Hearth Steel Castings.—In 1894 there were 28 open-hearth steel plants which were prepared to make direct castings, in 1896 there were 35 plants, and in 1898 there are 47 plants. In addition to these plants there are enumerated in the present edition of the Directory several crucible steel casting plants and a few plants which make Bessemer and other steel castings.

Crucible Steel Works.—In April last we had 45 completed crucible steel plants and one projected plant. The aggregate annual capacity of the existing crucible steel works is 95,000 gross tons, against 98,700 tons in 1896.

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THE Translucent Fabric Co., of Quincy, Mass., found that its old plant did not give the required output and has built a new one which about trebles its capacity. The company recently completed a contract for furnishing the translucent fabric for all the skylights in the buildings at the Trans-Mississippi and International Exposition at Omaha. Nearly 100,000 square feet of the fabric was used at this exposition. Translucent fabric was specified exclusively for the skylights in preference to glass because of the assurance of water-tight skylights and skylights which could not break. Thus there would be no danger of falling pieces injuring people passing below the skylights. The business of the company among machine shops, foundries, etc., has generally grown and the Government is using translucent frabric in large quantities. Considerable of this material has been furnisehed for use in Klondike, as its advantages in such a country are especially apparent.

# INDUSTRIAL SUMMARY.

### New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Home Comfort Sad Iron Co., of Kansas City, Mo., has been incorporated, with capital of $30,000. The stockholders are Charles E. Jordan, M. J. Cordray, John C. Cruikshank, B. C. Smith and A. E. Cordray.

The Lee-Penberthy Mfg. Co., Detroit, has been incorporated with $100,000 capital for the manufacture of injectors and ejectors.

Chas. C. Jones, late of Douglass Furnace, Sharpsville, Pa., is reported to be planning for the erection of a small blast furnace and a pipe foundry at Seattle, Wash. Cast pipe will be manufactured for the Japanese trade.

The Defiance Mfg. Co. has been incorporated at Chicago, with a capital stock of $50,000, to manufacture machine and metal goods. Incorporators are Marcus Hitch, Major McGregor and A. C. McIlvaine.

The Litchfield Machine Co. has been incorporated at Litchfield, Ill., with a capital stock of $5,000, by S. M. Grubb, Geo. W. Amsden and Elizabeth Amsden.

At New Albany, Ind., the Todd Mfg. Co. has been formed with a capital stock of $20,000. Geo. Todd, of Louisville, Ky., is the principal stockholder. The company will manufacture engines, machinery and mechanical devices.

T. and H. Pierre, of Hartford City, Ind., will start a foundry at Orestes, Ind.

At Manitowoc, Wis., a company is being organized, with $20,000 capital, to manufacture aluminum novelties. Henry Vits, postmaster, is prominent in the enterprise. A local plant is to be remodeled.

The Catasauqua Iron Co., Catasauqua, Pa., was chartered last week, capital $30,000. It will operate Mill B, at Fullerton, formerly operated by the Catasauqua Mfg. Co. The product will be muck bars and refined bars, low in phosphorus and resembling the Swedish bars used in crucible steel manufacture. High grade stay bolt and rivet iron will also be made. The officers of the company are: Leonard Peckitt, president; J. S. Elverson, manager; W. S. Pilling, treasurer; T. I. Crane, secretary.

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### New Construction:—

At Kansas City, Mo., the Parlin-Orendorf Co., dealers in agricultural implements, have purchased the property of the Keystone Mfg. Co., and expect to erect a six story building. This will give 170,000 square feet of floor space, making it the largest implement house in the world.

The United Gas & Improvement Co., of Philadelphia, is making extensive additions to its gas producing plant. The plants are known as the 25th Ward and Point Breeze locations. At the 25th Ward gas works a new scrubber house 45 feet wide and 120 feet long is being built; a purifier house 80 feet wide and 180 feet long. At the Point Breeze works the company is erecting a new boiler and engine room 220 feet long and 55 feet wide; a condenser building, 40 feet wide and 105 feet long; a purifier building 86 feet wide and 180 feet long; a generator house 100 feet wide and 184 feet long; a meter house with additions for exhaust and valve room, having a width of 70 feet, and a total length of 223 feet. All these buildings are of steel frame construction, with brick side walls and slate roofs supported on metal purlins carried by clear span trusses. All the structural steel work for this extensive plant is being furnished and erected by the Berlin Iron Bridge Co., of East Berlin, Conn.

The contract has been let for the new stove works of Graff Bros., at Monongahela, Pa. The cost will be $100,000.

The Schoen Pressed Steel Co., Pittsburg, has received the contract for the equipment of 1,500 box cars, ordered by the Pennsylvania Railroad, with steel bolsters and trucks. The contract amounts to about $60,000. The Schoen company has decided to add to its plant in Allegheny so as to secure a capacity of from 20 to 50 cars a day. The probable cost will be $250,000.

Thomas Marshall, of Pittsburg, has been awarded the contract for furnishing the iron and steel structural work for the new postoffice building at San Francisco, at his bid of $154,915.

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Harrison Safety Boiler Works,
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The Northwestern Malleable Iron Co.'s new foundry at Milwaukee will be 70x520 feet and will cost $11,500.

Phillips & McLaren, Pittsburg, have been granted a permit for the erection of a large steel frame and iron-clad structure to be used as a machine works, foundry and pattern shop. The building is to be located at 24th and Smallman sts., and will cost $7,000.

**Additions, Enlargements, Removals, Etc.:—**

The Montpelier, Ind., tin plate plant, owned by the American Tin Plate Co., is to be removed, a dispatch says, to Elwood, Ind., and consolidated with the big plant there. The plant has made only black plate for some time.

The Pennsylvania Car Wheel Co. has given contracts that will considerably increase the capacity of its plant in Allegheny, Pa. Operations were started in April and since that time the company has received orders for 9,200 chilled charcoal iron wheels for the 50-ton cars being built by the Schoen Pressed Steel Co. Additional annealing equipment, new cranes and an additional wheel floor will be provided, increasing the output to 450 wheels a day. A plot of ground adjoining the works, 100x300 feet, has been leased and additional foundry room will probably be provided in the spring.

Plans have been prepared for an addition to the foundry of Ahrens & Ott, Louisville, Ky.

The Brown Mfg. Co., Zanesville, O., has planned an addition to its factory 176x50 feet, three stories. A new Corliss engine of 400 to 500 h. p. will be put in.

The Ohio Brass Co., Mansfield, O., has recently purchased the plant of the Standard Harness Hardware Co., of Canton, O., and removed the machinery to new buildings at Mansfield.

Extensive improvements have lately been completed in the plant of the Almy Water Tube Boiler Co., Providence, R. I. A large addition to the shop has been built and the arrangement of the machinery so changed as to greatly facilitate its operation. A large open space is left in the center of the building for the erection of the boilers.

The Burlington Iron Works, Burlington, Ia., are erecting an addition to their boiler shops.

**Fires and Accidents:—**

The American Iron Works, at Portland, Ore., burned June 16, with $8,000 loss on building and machinery.

The Biggs Boiler Works, at Akron, O., burned June 18, with $15,000 loss.

The walls of the United States Heater Co.'s uncompleted foundry at Detroit, were blown down.

At Detroit, the Buhl Stamping Co.'s tinning department, started last January, burned down June 21, with loss of about $14,000, covered by insurance.

Fire in the Detroit Bronze & Plating Works June 24, damaged the building $4,000 and the stock $7,000; insurance, $10,000.

Snead & Co.'s foundry and other buildings of its extensive plant at Louisville, Ky., burned June 23. Loss, $200,000; insurance, $150,000.

A storm on June 25 blew over a new wall in course of erection at the Carnegie Steel Co.'s Homestead plant.

At Milwaukee, Wis., the wagon factory of the Lauersdorf & Sevendson Co. was destroyed by fire June 19. Insured for $8,000.

**General Industrial Notes:—**

The Sheffield Rolling Mill, at Sheffield, Ala., emoved from Roanoke, Va., is rapidly being put in shape for operation.

At Leonardsville, N. Y., the Otsego Furnace, Co., which has operated a foundry and machine shop, has made an assignment.

Sheridan Furnace No. 1, at Sheridan, Pa., is in blast again, after a period of idleness and irregular operation. The Sheridan Iron Works Co., which bought the plant at public sale, will also, it is said, put the No. 2 stack in blast. The application for charter for the new company is signed by

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SAN FRANCISCO, John Woodlock, 26 Beale St.


Garrett B. Stevens, Wm. Kerper, John S. Kennedy, Philip H. Brice and Edgar Brusewitz.

The consolidation of furnace and range companies of Utica and Syracuse, N. Y., has been incorporated as the International Heater Co., of Utica, with $1,800,000 capital.

The Allison Iron Works, at Port Carbon, Pa., closed for two years, has started up with 60 men.

A committee of the Scranton, Pa., board of trade has been appointed to urge the Lackawanna Iron & Steel Co. to equip a mill for the manufacture of structural steel and of army and navy supplies, the movement being started by the slackness of operations at Scranton, as compared with other points.

The Center Furnace property, at Ironton O., was sold at public sale by Receiver Littlejohn, on June 18. The final bid was $19,996, the purchaser being Mrs. Lindsey Kelly, whose husband was lessee of the furnace. The property includes in addition to the stack and buildings a large tract of land, much of it farming land. The furnace was 40x10½, built in 1837, and charcoal iron was made.

The machine shops of the Eastern Minnesota Railway, recently erected in the yards at Superior, are being equipped with machinery and will start up about Aug. 1.

Some negotiations for the purchase of the Elgin, Joliet & Eastern belt line by the Illinois Steel Co. are reported, but there is nothing tangible in the matter.

At New Castle, Ind., the plant of the New Castle Bridge Co. has been sold to Eugene Runyan and Chas. Mouch. Its enlargement is probable.

The Alabama Steel & Shipbuilding Co., of Birmingham, has made a temporary organization, electing N. E. Barker president, J. K. McDonald vice-president, and P. G. Shook secretary and treasurer. Subscriptions for the bonds include $200,000 by the Louisville & Nashville, $200,000 by the Southern Railway, $100,000 by James T. Woodward, president of the Hanover National Bank, New York, and $100,000 by Moore & Schley, New York.

The Falls Rivet & Machine Co., Cuyahoga Falls, O., has taken a contract to furnish the Government 5,000 shrapnel shells.

The report of negotiations by the American Steel & Wire Co. to acquire the United States Wire Nail Co. is telegraphed. The United States Wire Nail Co. is the successor of Baackes & Co. In Ohio, certain labor leaders have called the attention of Attorney General Monnet to the American Steel & Wire Co., and asked him to investigate its status in view of the recently enacted anti-trust law. On the Chicago stock exchange, May earnings of the American Steel & Wire Co. were reported to be at the rate of 13 per cent on the common stock.

Improvements are being made at the plant of the New Philadelphia (O.) Iron & Steel Co. A new train of cold rolls has been added and new boilers are to follow.

The new sheet mill of the Hyde Park Iron & Steel Works, at Hyde Park, Pa., has been put in operation.

In view of the growing demand among belt users for a more convenient form of belt dressing than the paste, the Joseph Dixon Crucible Co., Jersey City, N. J., is now placing on the market a solid belt dressing in round bars, about eight inches long and two inches in diameter. While the company does not claim that the solid dressing is as good a preservative of the life and elasticity of the leather as the Dixon paste, it is quick to apply and quick to act.

Bids to supply 550 tons of cast pipe to Chicago Junction, O., were as follows: Lake Shore Foundry, Cleveland, $15.20; American Pipe & Foundry Co., Chattanooga, Tenn., $15.18; Addyston Pipe & Steel Co., Cincinnati, $14.75; Ohio Pipe Co., Columbus, O., $14.70. The contract was let to the Ohio Pipe Co.

The city council of Cleveland voted 17 to 3 to award the contract for cast iron pipe for the coming year to the Addyston Pipe & Steel Co., at the remarkably low price of $14.93, delivered on the streets of Cleveland. The bid of the local firm, the Lake Shore Foundry Co., was $15.10.

The Burgess Steel & Iron Works, Portsmouth, O., expect to resume operations as soon as possible. Insurance adjustments must be made before plans can be announced.

The New Castle Engineering Works, New Castle, Pa., have taken an order from the Oliver & Snyder Steel Co. for two Massicks & Crooke's stoves, one for Edith Furnace, in Allegheny, 20 feet 6 inches in diameter, and 80 feet high; and one for Rosena Furnace, at New Castle, Pa. They will also furnish a Cowper-Kennedy stove for Shenango Furnace for the Shenango Valley Steel Co., at New Castle, Pa. They have taken the contract for the iron work for eight Cowper stoves, complete with all castings, for the two new blast furnaces to be erected by the Lorain Steel Co., at Lorain, O. The stoves will be 21x100 feet.

At Wallingford, Conn., the following bids were received for furnishing 6-in. cast iron water pipe: Warren Foundry & Machine Co., New York, $19.60 gross ton, f. o. b. cars at Wallingford; M. J. Drummond & Co., New York, $17.50 net ton, and $19.60 gross ton; McNeal Pipe & Foundry Co., Bur-

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Machine Tools and Supplies. Send for list of Second-hand Tools.

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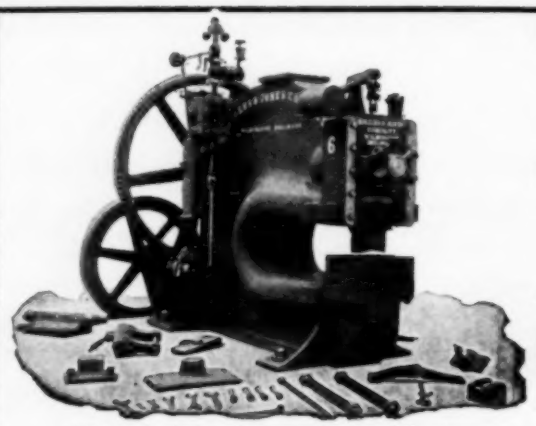
**A B C OF IRON,**

NOW $1.00.



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lington, N. J., $17.70 net ton; Chattanooga Foundry & Pipe Co., Chattanooga, Tenn., $17.40 net ton.

The Laughlin pig iron casting machine at the Eliza Furnace, Pittsburg, has been working successfully.

The Rogers Locomotive Co. has received an order for 15 10-wheel freight engines, and the Cooke Locomotive Works a similar order for 10 engines from the Missouri Pacific Railway Co. The Pennsylvania Railroad Co. has placed an order for 400 box cars with the Milton (Pa.) Car Works, and an order with the Terre Haute Mfg. Co., for 500 box cars of 80,000 pounds capacity. The New York Central has ordered 1,000 freight cars from the Michigan-Peninsular Car Co.

The Muncie (Ind.) Iron & Steel Co. will close down its mill July 1 for needed repairs. A new shear has been put in position and other equipment will be added.

The Westinghouse Electric & Mfg. Co. has declared a quarterly dividend of 1¼ per cent on the preferred stock, payable July 1.

Lochiel Furnace, Harrisburg, Pa., idle for a long time, is being started up by the Pennsylvania Steel Co.

Important improvements are being made in the steel rail plant of the Lackawanna Iron & Steel Co., Scranton, Pa. The mill will probably resume in August.

The Shenango Valley Steel Co., of New Castle, has awarded Wm. Swindell & Bros., of Pittsburg, the contract for the erection of eight annealing furnaces and eight gas producers.

The Carpenter Steel Co., Reading, Pa., now has 500 employes working day and night.

Not in some time has the Roach ship yard at Chester, Pa., been so overwhelmed with work as at present. According to present indications there will be launched from the yard this year nine vessels, aggregating 15,000 tons, and valued at $1,750,000, which is claimed to be a greater amount of merchant work than any other yard in the country can boast of.

At Port Carbon, Pa., the Allison Iron Works have started up, having contracts that will keep them busy until September.

Of the 1,500 box cars about to be added to the Pennsylvania Co.'s equipment, 500 will be built at the company's shops at Altoona.

The Kansas City Nut & Bolt Works, of Sheffield, Mo., have signed the Amalgamated scale for the first time.

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THE Cleveland Terminal & Valley Railroad Co.'s new West Side freight warehouse in Cleveland is especially arranged for the expeditious handling of lake freight. The steel superstructure is 500 by 50 feet, the sides and roof being of steel sheeting. The interior is equipped with ways and traveling cranes for the quick and easy handling of heavy freight through the building, and to and from the dock and the street sides. Twenty-five loading ways and doors on the dock and street sides facilitate the handling of freight. The river at the dock side has been dredged to a depth of 19 feet which insures safe passage of boats.

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THE Cleveland & Buffalo Transit Co. announces that its new steamer City of Erie, and its companion boat, the City of Buffalo, will cover the distance between Cleveland and Buffalo, 183 miles, in nine hours running time. The time of leaving Cleveland has been changed from 7 P. M. to 8 P. M.

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Angles, Channels and Special Shapes for Car, Carriage and Wagon Work.

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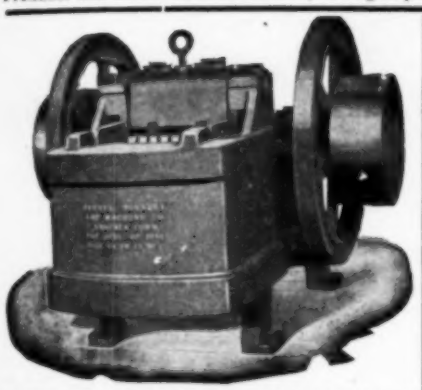
Regenerative Gas Furnaces and Water Seal Gas Producers.

Producer Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.



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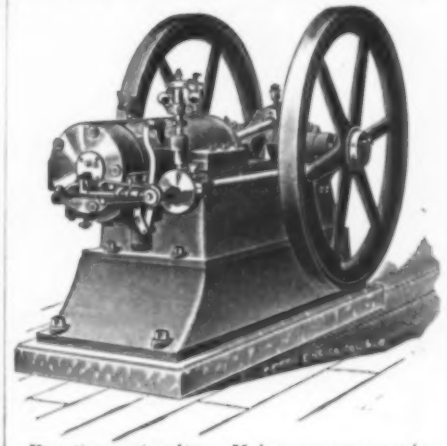

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A number of persons are arranging to make the trip from this locality to see the sights at the National Capital and visit relatives and friends among the soldiers at Camp Alger, near Washington. It will be a delightful way in which to spend the Glorious Fourth. Full particulars about rates, time of trains and other details will be furnished in reply to inquiries addressed to local Ticket Agent Pennsylvania Lines, or C. L. Kimball, A. G. P. Agt., Cleveland, O.

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Colorado to-day is nearer home than in former years. The fast schedules of the Pennsylvania Route and connecting lines bring the Centennial State within easy reach, and the cost of a trip thither is no longer a luxury. The special low rate Tourist Tickets over the Pennsylvania Lines places the cost for transportation within the limit of the usual allowance for vacation trips. For special information about rates, time of trains and other details please apply to nearest Pennsylvania Lines Ticket Agent, or address C. L. Kimball, A. G. P. Agent, Cleveland, O.

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The C. T. & V. R. R. in connection with the C. & M. Ry. now operates two trains daily (except Sunday) between Cleveland and Canal Dover, Newcomerstown, Cambridge, Marietta, and Parkersburg. Leave Cleveland 7:15 A. M., solid through trains to Marietta without change, arriving at Marietta at 3:10 P. M. Leave Cleveland 11:00 A. M. Arrive at Marietta 7:30 P. M. For rates and further particulars call on agents or address,

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For the Fourth of July Holiday, the Cleveland, Akron & Columbus R'y. will sell excursion tickets between all local stations and to many points on connecting lines at a rate of One Fare for the Round Trip.

Tickets on Sale July 2. 3 and 4, good returning until July 5, 1898, inclusive. Ask ticket agents for particulars. C. F. Daly, Gen. Pass. Agt.

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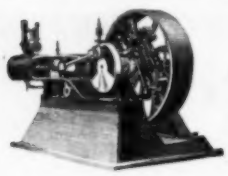
July 2d, 3d and 4th excursion tickets, at one fare for the round trip, will be sold account 4th of July festivities, via Pennsylvania Lines; return coupons good until Tuesday, July 5th, inclusive.



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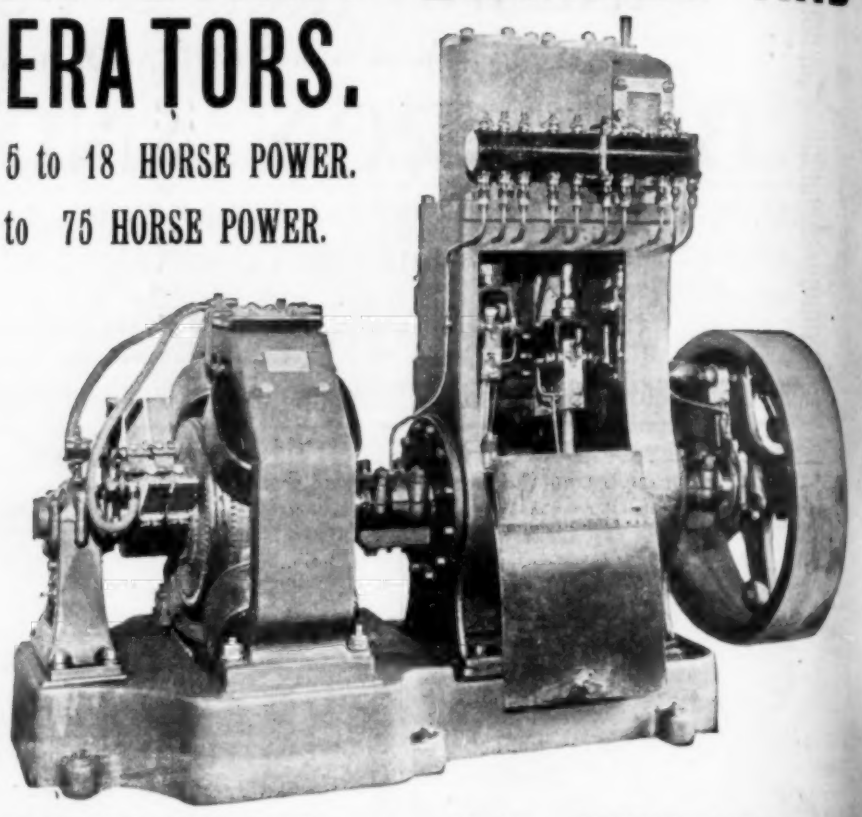

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